# SPRT ®

# SP-T8

# Portable Thermal Printer

# User's Manual

# Content

Content..... 2
Operating Precautions..... 7
Notes on Safety ..... 7
Notes on Using ..... 8
Notes on Handling..... 9
Chapter 1 Outer Appearance ..... 10
1.1 Outer Appearance ..... 10
1.2 Standard Accessories..... 10
Chapter 2 Specifications..... 10
Chapter 3 Operation ..... 12
3.1 Using Preparation..... 12
3.1.1 Battery Installation..... 12
3.1.2 Paper Installation..... 12
3.2 Operation Instructions ..... 13
3.2.1 Printer On/Off..... 13
3.2.2 Self-test..... 13
3.2.3 Paper Feeding ..... 14
3.2.4 Paper Tearing..... 14
3.2.5 Battery Using and Charging..... 14
3.3 Communication Interface ..... 15
3.3.1 RS-232 Serial Interface..... 15
3.3.2 IrDA Connection ..... 17
3.3.3 Bluetooth Connection ..... 18

3.4 Other Functions ..... 19
3.4.1 Sleeping Mode ..... 19
3.4.2 Paper End Alarming ..... 19
3.4.3 Black Mark ..... 19
3.5 Indicators ..... 20
Chapter 4 Printing Control Commands ..... 21
Summary ..... 21
HT ..... 21
LF ..... 22
FF ..... 22
CR ..... 23
CAN ..... 24
DLE EOT n ..... 24
DLE ENQ n ..... 28
DLE DC4 n m t ..... 30
ESC FF ..... 32
ESC SP n ..... 32
ESC ! n ..... 34
ESC $ nL nH ..... 35
ESC % n ..... 37
ESC & y c1 c2 [x1 d1...d(y ˙ x1)]...[xk d1...d(y ˙ xk)] . 37
ESC ˙m nL nH d1... dk ..... 41
ESC – n ..... 44
ESC 2 ..... 46
ESC 3 n ..... 46
ESC = n ..... 47

ESC ? n ..... 48
ESC @ ..... 49
ESC D n1...nk NUL ..... 49
ESC E n ..... 51
ESC G n ..... 51
ESC J n ..... 52
ESC L ..... 53
ESC M n ..... 55
ESC S ..... 55
ESC T n ..... 56
ESC V n ..... 58
ESC W xL xH yL yH dxL dxH dyL dyH ..... 59
ESC \ nL nH ..... 62
ESC a n ..... 63
ESC c 0 n ..... 64
ESC c 3 n ..... 65
ESC c 4 n ..... 67
ESC c 5 n ..... 67
ESC d n ..... 68
ESC p m t1 t2 ..... 69
ESC { n ..... 70
FS p n m ..... 71
FS q n [xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]n 73
GS FF ..... 79
GS ! n ..... 79
GS # n ..... 81

GS $ nL nH ..... 82
GS ( A pL pH n m ..... 83
GS x y d1...d(x . y . 8) ..... 84
GS / m ..... 86
GS : ..... 88
GS B n ..... 89
GS H n ..... 90
GS I n ..... 91
GS L nL nH ..... 93
GS P x y ..... 94
①GS V m ②GS V m n ..... 96
GS W nL nH ..... 97
GS \ nL nH ..... 99
GS ^ r t m ..... 100
GS a n ..... 101
GS f n ..... 105
GS h n ..... 106
① GS k m d1...dk NUL ② GS k m n d1...dn ..... 106
GS r n ..... 112
GS v 0 m xL xH yL yH d1....dk ..... 113
GS w n ..... 116
FS ! n ..... 116
FS & ..... 118
FS – n ..... 119
FS . ..... 120
FS 2 c1 c2 d1...dk ..... 120

FS S n1 n2 ..... 122
FS W n ..... 124

# Operating Precautions

This section presents important information intended to ensure safe and effective use of the printer. Please read the following carefully.

## Notes on Safety

Be sure to use the specified battery and power source provided by our company. Connection to an improper power source may cause fire, explosion or damage to the printer.

Don’t put the battery into the fire or water, don’t disassemble or modify the battery, don’t be short circuit, otherwise may result in injury or fire even explosion.

If the printer would not be used for a long time, be sure to take off the battery, otherwise the battery may leak liquid which is corrosive, if improper operation causes battery leak, and the liquid is spattered on the skin or clothes, please wash it with water, if spattered in the eyes, please rinse them with water thoroughly and see a doctor.

Please do not open the paper case cover when it is printing or just when printing is over, do not touch the print head with hand or body, overheat may cause scald.

## Notes on Using

Be sure not to print continuously over 1 meter, otherwise may cause damage to the print head.

Water or other liquid should not spill into the printer, also the printer should not be appeared in the rain, or else may cause printer damage.
Please do not open the paper case cover when it is printing, otherwise the printer may work improperly.

If print with serial interface, should not unplug the interface cable in the course of printing, or else some printing data may be lost.
When print in Ir or IrDA mode, be sure the Ir window of the host equipment face rightly the Ir window of the printer, the distance should be within the range of 50mm, and the angle should be within the range of $30^{o}$.
When print with Bluetooth interface, the communication distance should be within 10 meters, otherwise the printer doesn't print or prints rubbish codes.

Too high（45℃）or too low（5℃） temperature and too high (85％)or too low (20％) relative humidity both effect the print quality.
The print paper in poor quality or stored for too long time also

may reduce the print quality even damage the printer.

In the black mark detecting mode, the printer requires that the ready-print black mark is accordant with the black mark printing rules (details please refer to Chapter 5), otherwise the black mark can not be detected correctly.

Be sure to use up the electricity of the battery before charge it, as it can ensure the using life of the battery.

## Notes on Handling

The printer should be placed in such an environment that the temperature is between -20℃ and 60℃, and the relative humidity is between 5% and 95%.

If the printer will be stored for a long time, pleas be sure to take out the battery, otherwise may damage the battery and printer.

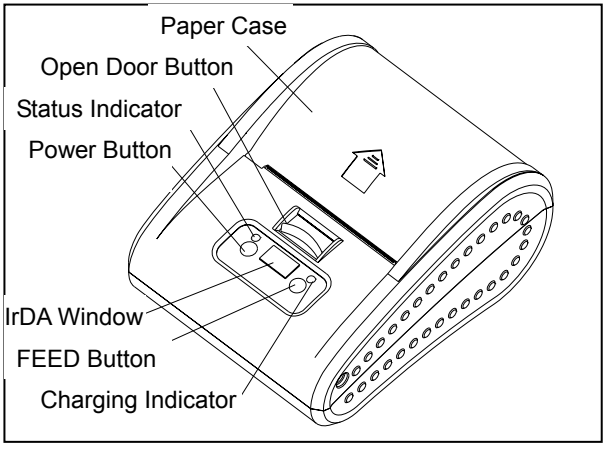
When the Li battery is stored over 3 months,it shoud be taken out to charge one time, in order to avoid the battery damage.

Normal thermal paper can’t be kept too long, if you need to keep the receipt for a long period, please choose long term effective thermal paper.
The print paper should be keep away from high temperature

environment and point-blank sunshine.

# Chapter 1 Outer Appearance

## 1.1 Outer Appearance




## 1.2 Standard Accessories

Power Adaptor (1 unit)
Rechargeable battery (1 unit)
Thermal Paper (1 roll)
Leather Case (1 unit)

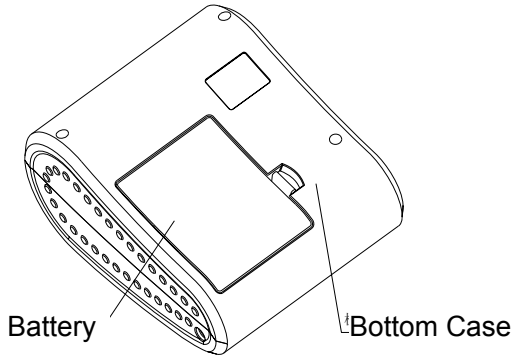
# Chapter 2 Specifications

| | |
|---|---|
| Model | T8 |
| Outline Dimension | 153×120×80（L×W×H） |
| Weight | 516g（paper roll excluded） |
| Printing Method | Thermal |
| Printing Paper | 80±0.5mm or 76±0.5mm x ≤60mm |
| Dot/line | 576dots |
| Printing Speed | 60mm /s (Average)；80mm/s (Max) |
| Paper Thickness | 0.06～0.085mm |
| Black Mark | Support |
| Reliability | 100 Km |
| Character Set | ASCII（8×8 / 12×12）<br>GB18030( 16×16 / 24×24) |
| Interface | RS-232, IrDA , Bluetooth |
| Rechargeable Battery | 2100mAh/7.4V |
| Power Adaptor | 12V/2A |
| Battery Duration | 800 receipts |
| Operation Temperature/Humidity | －10℃～50℃/20％～80％ |
| Charging Temperature/Humidity | 5℃～35℃/20％～80％ |
| Storage Temperature/Humidity | －20℃～60℃/5％～95％ |

# Chapter 3 Operation

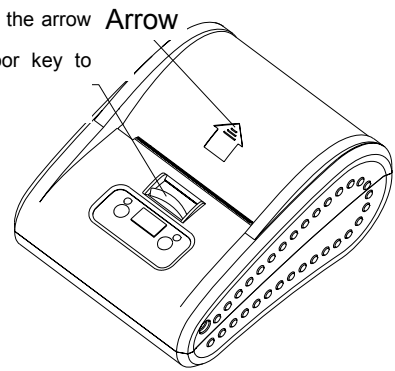
## 3.1 Using Preparation

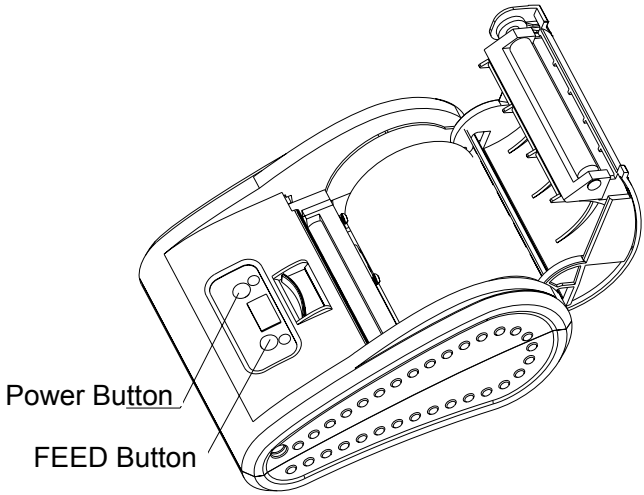
### 3.1.1 Battery Installation




### 3.1.2 Paper Installation

Under the direction of the arrow to pull the Open Door key to open the paper case.






## 3.2 Operation Instructions

### 3.2.1 Printer On/Off

The printer is powered on by pressing the power button about 1 second; and the status indicator is on with red color.

The printer is powered off by pressing the power button about 1 second; and all the indicators are off when the printer is powered off.

Notice: If the power indication is on with green color, it means the printer is in sleeping status.

### 3.2.2 Self-test

The self-test checks the printer's current settings, status and whether the printer has any problems. Turn on the power

while holding down the FEED button, the self-test begins. The self-test prints the current printer status and settings. The self-test automatically ends. The printer is ready to receive data as soon as it completes the self-test.

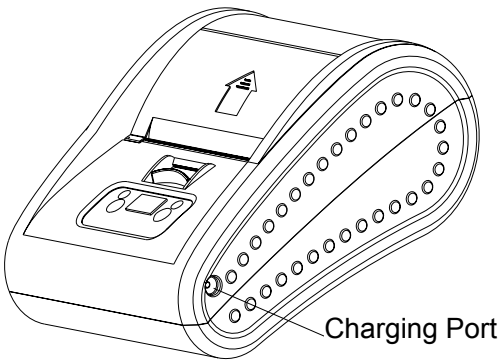
### 3.2.3 Paper Feeding

When the printer works normally, hold down【FEED】button, the paper feeding begins, and stops when hold down【FEED】button again.

### 3.2.4 Paper Tearing

After each receipts is finished printing, it needs to tear off the paper along the tear bar. Please don't use too much strength. Otherwise the paper will be pulled out from the paper case.

### 3.2.5 Battery Using and Charging



After the printer is used for a period of time, the power of battery will be run out. When the battery is low, the power indicator blinks with red color and the buzzer rings 3 times; if the printer is in sleeping mode, the printer will cut off power after the buzzer rings 3 times. In this case, you must charge the battery by using the adaptor.

The charging method is as following: turn off the printer, connect the adapter to the power socket with 220V, 50HZ, then plug the power charging cable to the power socket of the printer, so the power charging begins, during the course of power charging, the charging indicator is on, and will be off when the charging is over.

Notice: it would better not turn on the printer during the course of charging power, lest the charging time goes longer, moreover, be sure not to use the printer to print when the battery is charging.

## 3.3 Communication Interface

### 3.3.1 RS-232 Serial Interface

The standard accessories for T8 printer include: DB-9 serial interface cable (one end is D model standard serial interface socket, connected to host computer, the other end is PS/2 socket, connected to printer).

When connect the serial interface, if it works normally, then the printer stops to received data from Bluetooth, or IrDA

interface.

The specification of serial interface of T8 as below:

Data Transfer: Serial

Synchro Mode: asynchronous

Handshaking: Hardware RST/CTS or Xon/Xoff optional

Signal Level: RS-232

Baud Rate:1200, 2400, 4800, 9600, 19200, 38400, 57600，115200bps optional

Data Bit: 7 bit, 8 bit optional

Parity: Odd, Even, None optional

Stop Bit: 1 bit

The ex-factory default setting is:

Baud rate: 9600bps

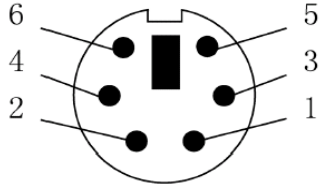
Handshaking: hardware

Data Bit: 8 bit

Parity: none

User can change the settings by using the Setting Tool.

Definition for the PS/2 socket:



1.TXD: send data

2.DTR: ready signal

3.RXD: receive data

4.RTS: when the signal is “MARK”, means printer is busy, can’t receive data; when the signal is “SPACE”, means the printer is ready to receive data.

5.GND: ground

6.NC: reserved

### 3.3.2 IrDA Connection

The hardware of T8 with infrared port printer is compatible with IrDA1.1. IrCOMM protocol is one of the sub-protocol of IrDA and widely used in portable devices. RAW-Ir data transmission mode can be connected to the devices with raw infrared port for printing, while IrCOMM mode can be connected to the devices with IrCOMM protocol for printing. RAW-Ir can work under 9600bps, 19200bps, 38400bps, 57600bps, 115200bps, the baud rate of RAW-Ir is same to that of serial interface.

Notice:

1) To use the T8’s infrared port, a computer or Personal Digital Assistant (PDA) with IR port is required.

2) Position a PDA conforming to the specifications in point not more than 50 centimeter away from the printer’s infrared

port. Make sure the two ports are in front of each other with an angle of not more than 30° on the four side.

### 3.3.3 Bluetooth Connection

PDA, Laptop and other communication devices with Bluetooth can drive T8-BT to print by the Bluetooth interface. T8-BT is compatible with Bluetooth 2.0 protocol. Power grade is CLASS 2; effective communication distance is 10 meters. The name of the printer is T8 Bluetooth Printer, the initial password is “1234”; users can change the printer name and password by using Setting Tools.

**Bluetooth Pairing:**

The method for the pairing between T8-BT with the host device is:

1. Turn on the printer;
2. Host device searches for the outer Bluetooth device;
3. If there are other Bluetooth devices, please select T8 Bluetooth Printer;
4. Put in password “1234”
5. Pairing finished.

Notice: If the printer name has been changed, please be sure not turn on more than one printer, otherwise it will be difficult to justify which printer been paired.

**Binding of Address:**

Binding: once the printer remembers the device's address, it only can connect with the device and can't connect with others. So in this case, if the printer needs to connect with other device, user can delete the remembered address.
No binding: in this case, the printer can be searched or paired by any other device. So when the printer needs to connect with a fixed device, it would be better bind address.

## 3.4 Other Functions

### 3.4.1 Sleeping Mode

Sleeping: the printer will fall after at least 3 seconds without usage into sleep, and the status indication becomes green; also the printer can be awaken by sending command 0x00, then send data, the time spacing is about 20ms.

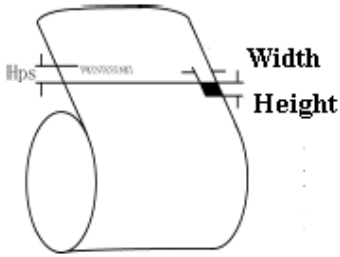
### 3.4.2 Paper End Alarming

When the paper is run out, the buzzer of the printer will ring 2 times, informs the user to load paper.

### 3.4.3 Black Mark

If user uses ready printing black mark to localize the receipt, please be sure to abide by the following black mark ready printing regulation when print the black mark, otherwise the black mark can't be recognized by the printer. The black mark ready printing regulation:

Print position: as the following figure shows, the black mark should be printed on the right of the word side.
Width range: ≥18mm
Height range: 4mm≤height≤6mm
Reflectivity to infrared ray: <10% (the reflectivity of the other parts of the paper black mark width to infrared ray >65%)




## 3.5 Indicators

There are two indicators for T8 printer. They are status indicator and charging indicator. Status indicator has two colors: red and green. The following is the meaning of each indicator denotes:

| Status Indicator | Charging status | Status |
|---|---|---|
| Red LED blinking | — | Working |
| Solid GREEN(left) | — | Sleeping |
| — | Solid GREEN(right) | Charging |

# Chapter 4 Printing Control Commands

## Summary

T8 offers ESC/POS print command set.

Each command is described in following format:

**Name** **Function**

Format: ASCII: the standard ASCII character sequence
Hex: the Hexadecimal number sequence
Decimal: the Decimal number sequence

Range: the range of n;

Description: the detailed explanation of the command;

Notes: some notes shall be paid attention to;

Reference: other commands which are relevant to it.

## HT

[Name] Horizontal tab

[Format] ASCII HT
Hex 09
Decimal 9

[Description] Moves the print position to the next horizontal tab position.

[Notes]

. This command is ignored unless the next horizontal tab position has been set.

. If the next horizontal tab position exceeds the printing area,

the printer sets the printing position to [Printing area width + 1].

. Horizontal tab positions are set with **ESC D**.

. If this command is received when the printing position is at [printing area width+ 1], the printer executes print buffer-full printing of the current line and horizontal tab processing from the beginning of the next line.

. The default setting of the horizontal tab position for the paper roll is font A (12 . 24) every 8th character (9th, 17th, 25th, ... column).

[Reference] **ESC D**

## LF

[Name] Print and line feed

[Format] ASCII LF
Hex 0A
Decimal 10

[Description] Prints the data in the print buffer and feeds one line based on the current line spacing.

[Note] This command sets the print position to the beginning of the line.

[Reference] **ESC 2**, **ESC 3**

## FF

[Name] Print and return to standard mode in page mode

[Format] ASCII FF

Hex 0C
Decimal 12

[Description] Prints the data in the print buffer collectively and returns to standard mode.

[Notes]

. The buffer data is deleted after being printed.

. The printer does not execute paper cutting.

. This command sets the print position to the beginning of the line.

. This command is enabled only in page mode.

[Reference] **ESC FF**, **ESC L**, **ESC S**

## CR

[Name] Print and carriage return

[Format] ASCII CR
Hex 0D
Decimal 13

[Description] When automatic line feed is enabled, this command functions the same as **LF**; when automatic line feed is disabled, this command is ignored.

[Notes]

. Sets the print starting position to the beginning of the line.

. The automatic line feed is ignored with a serial interface model.

. This command is set according to the DIP switch setting with a parallel interface model.

[Reference] **LF**

## CAN

[Name] Cancel print data in page mode

[Format] ASCII CAN
Hex 18
Decimal 24

[Description] In page mode, deletes all the print data in the current printable area.

[Notes]

. This command is enabled only in page mode.

. If data that existed in the previously specified printing area also exists in the currently specified printing area, it is deleted.

[Reference] **ESC L**, **ESC W**

## DLE EOT n

[Name] Real-time status transmission

[Format] ASCII DLE EOT n
Hex 10 04 n
Decimal 16 4 n

[Range] 1 . n . 4

[Description] Transmits the selected printer status specified by n in real-time, according to the following parameters:

n = 1: Transmit printer status

n = 2: Transmit off-line status

n = 3: Transmit error status

n = 4: Transmit paper roll sensor status

[Notes]

. The status is transmitted whenever the data sequence of <10>H<04>H< n> (1 . n . 4) is received.

Example:

In **ESC .m nL nH d1...dk**, d1=<10>H, d2=<04>H, d3=<01>H

. This command should not be used within the data sequence of another command that consists of 2 or more bytes.

Example:

If you attempt to transmit **ESC 3 n** to the printer, but DTR (DSR for the host computer) goes to MARK before n is transmitted and then **DLE EOT 3** interrupts before n is received, the code <10>H for **DLE EOT 3** is processed as the code for **ESC 3 <**10>H.

. Even though the printer is not selected using **ESC =** (select peripheral device), this command is effective.

. The printer transmits the current status. Each status is represented by one byte data.

. The printer transmits the status without confirming whether the host computer can receive data.

. The printer executes this command upon receiving it.

. This command is executed even when the printer is off-line, the receive buffer is full, or there is an error status with a serial interface model.

. With a parallel interface model, this command can not be executed when the printer is busy. This command is executed even when the printer is off-line or there is an error status when DIP switch 2-1 is on with a parallel interface model.

. When Auto Status Back (ASB) is enabled using the **GS a** command, the status transmitted by the **DLE EOT** command and the ASB status must be differentiated. (Refer to Appendix G, TRANSMISSION STATUS IDENTIFICATION)

n = 1: Printer status

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Not used. Fixed to Off. |
| 1 | On | 02 | 2 | Not used. Fixed to On. |
| 2 | Off | 00 | 0 | Drawer open/close signal is LOW (connector pin 3). |
| | On | 04 | 4 | Drawer open/close signal is HIGH (connector pin 3). |
| 3 | Off | 00 | 0 | On-line. |
| | On | 08 | 8 | Off-line. |
| 4 | On | 10 | 16 | Not used. Fixed to On. |
| 5,6 | - | - | - | Undefined. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

n = 2: Off-line status

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Not used. Fixed to Off. |
| 1 | On | 02 | 2 | Not used. Fixed to On. |
| 2 | Off | 00 | 0 | Cover is closed. |
| | On | 04 | 4 | Cover is open. |
| 3 | Off | 00 | 0 | Paper is not being fed by using the FEED button. |
| | On | 08 | 8 | Paper is being fed by the FEED button. |
| 4 | On | 10 | 16 | Not used. Fixed to On. |
| 5 | Off | 00 | 0 | No paper-end stop. |
| | On | 20 | 32 | Printing is being stopped. |
| 6 | Off | 00 | 0 | No error. |
| | On | 40 | 64 | Error occurs. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

Bit 5: Becomes on when the paper end sensor detects paper end and printing stops.

n = 3: Error status

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Not used. Fixed to Off. |
| 1 | On | 02 | 2 | Not used. Fixed to On. |
| 2 | – | – | – | Undefined |
| 3 | Off | 00 | 0 | No auto-cutter error. |
| | On | 08 | 8 | Auto-cutter error occurs. |
| 4 | On | 10 | 16 | Not used. Fixed to On. |
| 5 | Off | 00 | 0 | No unrecoverable error. |
| | On | 20 | 32 | Unrecoverable error occurs. |
| 6 | Off | 00 | 0 | No auto-recoverable error. |
| | On | 40 | 64 | Auto recoverable error occurs. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

Bit 3: If these errors occur due to paper jams or the like, it is possible to recover by correcting the cause of the error and executing **DLE ENQ n** (1 ≦ n ≦ 2). If an error due to a circuit failure (e.g. wire break) occurs, it is impossible to recover.
Bit 6: When printing is stopped due to high print head temperature until the print head temperature drops sufficiently or when the paper roll cover is open during printing, bit 6 is On.
n = 4: Continuous paper sensor status

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Not used. Fixed to Off. |
| 1 | On | 02 | 2 | Not used. Fixed to On. |
| 2, 3 | Off | 00 | 0 | Paper roll near-end sensor: paper adequate. |
| | On | 0C | 12 | Paper near-end is detected by the paper roll near-end sensor. |
| 4 | On | 10 | 16 | Not used. Fixed to On. |
| 5, 6 | Off | 00 | 0 | Paper roll sensor: Paper present. |
| | On | 60 | 96 | Paper roll end detected by paper roll sensor. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

[Reference] **DLE ENQ**, **GS a**, **GS r**

## DLE ENQ n

[Name] Real-time request to printer

| [Format] | ASCII | DLE | ENQ | n |
|---|---|---|---|---|
| | Hex | 10 | 05 | n |
| | Decimal | 16 | 5 | n |

[Range] 1 ≦ n ≦ 2

[Description] Responds to a request from the host computer. n specifies the requests as follows:

| *n* | Request |
|---|---|
| 1 | Recover from an error and restart printing from the line where the error occurred |
| 2 | Recover from an error aft clearing the receive and print buffers |

[Notes]

. This command is effective only when an auto-cutter error occurs.

. The printer starts processing data upon receiving this command.

. This command is executed even when the printer is off-line, the receive buffer is full, or there is an error status with a serial interface model.

. With a parallel interface model, this command can not be executed when the printer is busy. This command is executed even when the printer is off-line or there is an error status when DIP switch 2-1 is on with a parallel interface model.

. The status is also transmitted whenever the data sequence of <10>H<05>H< n> (1 . n . 2) is received.

Example:

In **ESC . m nL nH dk**, d1 = <10>H, d2 = <05>H, d3 = <01>H

. This command should not be contained within another command that consists of two or more bytes.

Example:

If you attempt to transmit **ESC 3 n** to the printer, but DTR (DSR for the host computer) goes to MARK before n is transmitted, and **DLE ENQ 2** interrupts before n is received, the code <10>H for **DLE ENQ 2** is processed as the code for **ESC 3** <10>H.

. **DLE ENQ 2** enables the printer to recover from an error after clearing the data in the receive buffer and the print buffer. The printer retains the settings (by **ESC !**, **ESC 3**, etc.) that were in effect when the error occurred. The printer can be initialized completely by using this command and **ESC @**. This command is enabled only for errors that have the possibility of recovery, except for print head temperature error.

. When the printer is disabled with **ESC =** (Select peripheral device), the error recovery functions (**DLE ENQ 1** and **DLE ENQ 2**) are enabled, and the other functions are disabled.

[Reference] **DLE EOT**

## DLE DC4 n m t

[Name] Generate Drawer kick-out on & off pulse at real-time

[Format]

| | | | | | |
|---|---|---|---|---|---|
| ASCII | DLE | DC4 | n | m | t |
| Hex | 10 | 14 | n | m | t |
| Decimal | 16 | 20 | n | m | t |

[Range] n = 1; m = 0, 1; 1 . t . 6

[Description] Outputs the pulse specified by t to connector pin m as follows:

| *m* | Connector pin |
|---|---|
| 0 | Drawer kick-out connector pin 2. |
| 1 | Drawer kick-out connector pin 5. |

The pulse ON time is [ t ． 100 ms] and the OFF time is [ t ． 100ms].

[Notes]

． When the printer is in an error status when this command is processed, this command is ignored.

． When the pulse is output to the connector pin specified while **ESC p** or **DEL DC4** is executed while this command is processed, this command is ignored.

． The printer executes this command upon receiving it.

． With a serial interface model, this command is executed even when the printer is off-line, the receive buffer is full, or there is an error status.

． With a parallel interface model, this command cannot be executed when the printer is busy. This command is executed even when the printer is off-line or here is an error status when DIP switch 2-1 is on.

． If print data includes the same character strings as this command, the printer performs the same operation specified by this command. The user must consider this.

． This command should not be used within the data sequence of another command that consists of 2 or more bytes.

. This command is effective even when the printer is disabled with **ESC =** (Select peripheral device).
[Reference] **ESC p**

## ESC FF

[Name] Print data in page mode
[Format] ASCII ESC FF
Hex 1B 0C
Decimal 27 12
[Description] In page mode, prints all buffered data in the printing area collectively.
[Notes]
. This command is enabled only in page mode.
. After printing, the printer does not clear the buffered data, setting values for **ESC T** and **ESC W**, and the position for buffering character data.
[Reference] **FF**, **ESC L**, **ESC S**

## ESC SP n

[Name] Set right-side character spacing
[Format] ASCII ESC SP n
Hex 1B 20 n
Decimal 27 32 n
[Range] 0 . n . 255
[Description] Sets the character spacing for the right side of the character to [ n . horizontal or vertical motion units].

[Notes]

. The right-side character spacing for double-width mode is twice the normal value. When characters are enlarged, the right-side character spacing is n times normal value.

. This command does not affect the setting of Chinese characters.

. This command sets values independently in each mode (standard and page modes).

. The horizontal and vertical motion unit are specified by **GS P**. Changing the horizontal or vertical motion unit does not affect the current right-side spacing.

. The **GS P** command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.

. In standard mode, the horizontal motion unit is used.

. In page mode, the horizontal or vertical motion unit differs in page mode, depending on starting position of the printable area as follows:

①When the starting position is set to the upper left or lower right of the printable area using **ESC T**, the horizontal motion unit ( x) is used.

②When the starting position is set to the upper right or lower left of the printable area using **ESC T**, the vertical motion unit ( y) is used.

. The maximum right-side spacing is 255/180 inches. Any

setting exceeding the maximum is converted to the maximum automatically.
[Default] n = 0
[Reference] **GS P**

## ESC ! n

[Name] Select print mode(s)
[Format] ASCII ESC ! n
Hex 1B 21 n
Decimal 27 33 n
[Range] 0 ≤ n ≤ 255
[Description] Selects print mode(s) using n as follows:

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Character font A (12 × 24). |
| | On | 01 | 1 | Character font B (9 × 17). |
| 1 | - | - | - | Undefined. |
| 2 | - | - | - | Undefined. |
| 3 | Off | 00 | 0 | Emphasized mode not selected. |
| | On | 08 | 8 | Emphasized mode selected. |
| 4 | Off | 00 | 0 | Double-height mode not selected. |
| | On | 10 | 16 | Double-height mode selected. |
| 5 | Off | 00 | 0 | Double-width mode not selected. |
| | On | 20 | 32 | Double-width mode selected. |
| 6 | - | - | - | Undefined. |
| 7 | Off | 00 | 0 | Underline mode not selected. |
| | On | 80 | 128 | Underline mode selected. |

[Notes]

. When both double-height and double-width modes are selected, quadruple size characters are printed.

. The printer can underline all characters, but can not underline the space set by **HT** or 90 . clockwise rotated characters.

. The thickness of the underline is that selected by **ESC** ~, regardless of the character size.

. When some characters in a line are double or more height, all the characters on the line are aligned at the baseline.

. **ESC E** can also turn on or off emphasized mode. However, the setting of the last received command is effective.

. **ESC** ~ can also turn on or off underline mode. However, the setting of the last received command is effective.

. **GS !** can also select character size. However, the setting of the last received command is effective.

. Emphasized mode is effective for alphanumeric and Chinese. All print modes except emphasized mode is effective only for alphanumeric.

[Default] n = 0

[Reference] **ESC -**, **ESC E**, **GS !**

## ESC $ nL nH

[Name] Set absolute print position

[Format]

| ASCII | ESC | $ | nL | nH |
|---|---|---|---|---|
| Hex | 1B | 24 | nL | nH |

Decimal 27 36 nL nH

[Range] 0 ≤ nL ≤ 255; 0 ≤ nH ≤ 255

[Description] Sets the distance from the beginning of the line to the position at which subsequent characters are to be printed.

· The distance from the beginning of the line to the print position is [( nL + nH × 256) × (vertical or horizontal motion unit)] inches.

[Notes]

· Settings outside the specified printable area are ignored.

· The horizontal and vertical motion unit are specified by **GS P**.

· The **GS P** command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.

· In standard mode, the horizontal motion unit ( x) is used.

· In page mode, horizontal or vertical motion unit differs depending on the starting position of the printable area as follows:

① When the starting position is set to the upper left or lower right of the printable area using **ESC T**, the horizontal motion unit ( x) is used.

② When the starting position is set to the upper right or lower left of the printable area using **ESC T**, the vertical motion unit ( y) is used.

[Reference] **ESC **, **GS $**, **GS **, **GS P**

## ESC % n

[Name] Select/cancel user-defined character set

[Format] ASCII ESC % n

Hex 1B 25 n

Decimal 27 37 n

[Range] 0 ≤ n ≤ 255

[Description] Selects or cancels the user-defined character set.

• When the LSB of n is 0, the user-defined character set is canceled.

• When the LSB of n is 1, the user-defined character set is selected.

[Notes]

• When the user-defined character set is canceled, the internal character set is automatically selected.

• n is available only for the least significant bit.

[Default] n = 0

[Reference] **ESC &**, **ESC ?**

## ESC & y c1 c2 [x1 d1...d(y × x1)]...[xk d1...d(y × xk)]

[Name] Define user-defined characters

[Format] ASCII ESC & y c1 c2 [x1 d1...d(y × x1)]...[xk d1...d(y × xk)]

Hex 1B 26 y c1 c2 [x1 d1...d(y

. x1)]...[xk d1...d(y . xk)]

Decimal 27 38 y c1 c2 [x1 d1...d(y . x1)]...[xk d1...d(y . xk)]

[Range] y = 3;

32 . c1 . c2 . 126;

0 . x . 12 Font A (12 . 24);

0 . x . 9 Font B (9 . 17)

0 . d1 ... d(y . xk) . 255

[Description] Defines user-defined characters.

. y specifies the number of bytes in the vertical direction.

. c1 specifies the beginning character code for the definition, and c2 specifies the final code.

. x specifies the number of dots in the horizontal direction.

[Notes]

. The allowable character code range is from ASCII code <20>H to <7E>H (95 characters).

. It is possible to define multiple characters for consecutive character codes. If only one character is desired, use c1 = c2.

. d is the dot data for the characters. The dot pattern is in the horizontal direction from the left side. Any remaining dots on the right side are blank.

. The data to define a user-defined character is (y . x) bytes.

. Set a corresponding bit to 1 to print a dot or 0 to not print a dot.

. This command can define different user-defined character

patterns by each fonts. To select a font, use **ESC !**

. A user-defined character and a downloaded bit image cannot be defined simultaneously. When this command is executed, the downloaded bit image is cleared.

. The user-defined character definition is cleared when:

①**ESC @** is executed.

②**ESC ?** is executed.

③**FS q** is executed.

④**GS .** is executed.

⑤The printer is reset or the power is turned off.

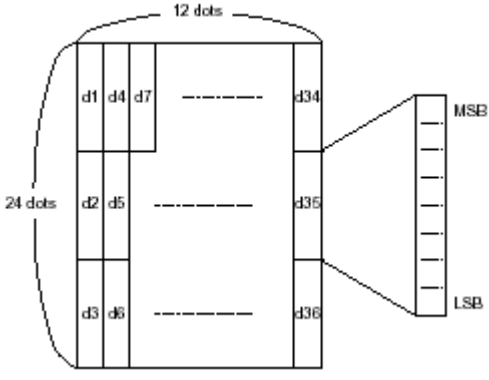
. When the user-defined characters are defined in font B (9 . 17), only the most significant bit of the 3rd byte of data in vertical direction is effective.

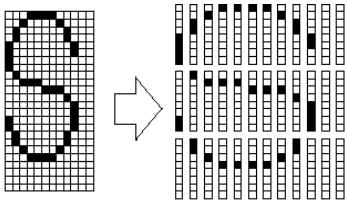
[Default] The internal character set

[Reference] **ESC %**, **ESC ?**

[Example]

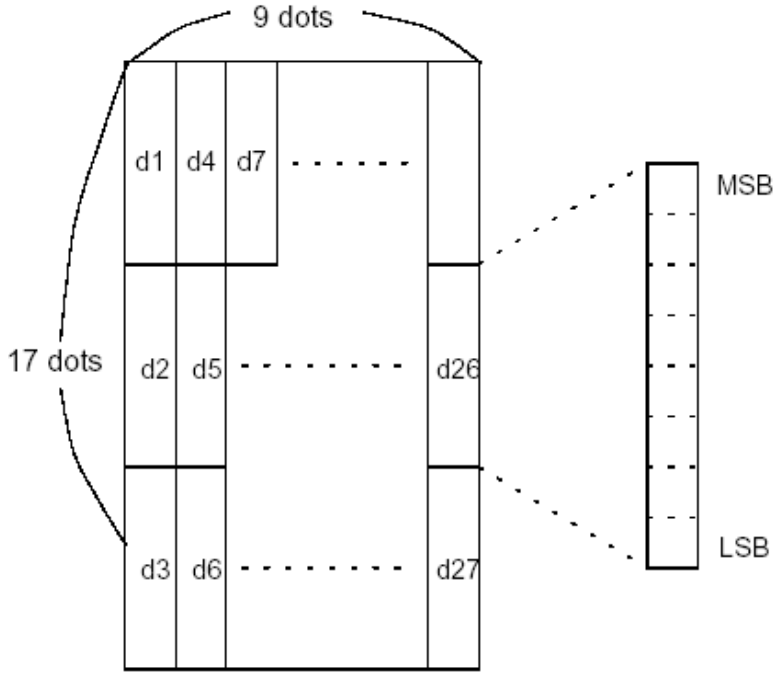
. When font A (12 . 24) is selected.

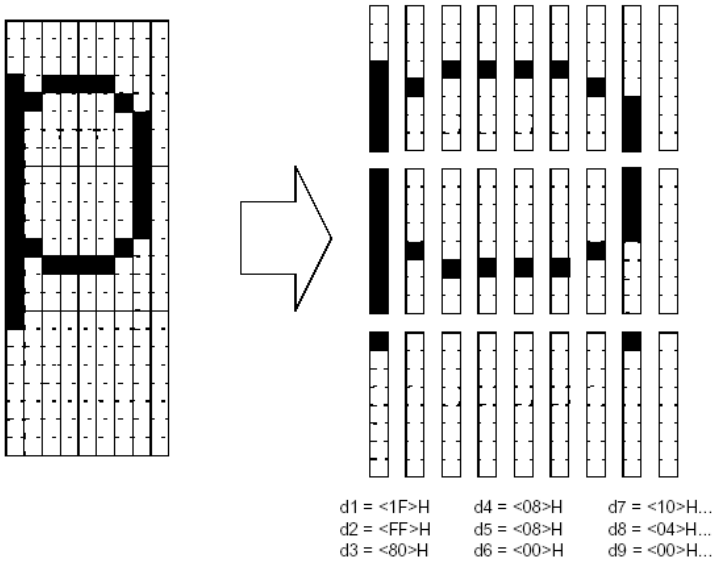




d1= <0F>H d4 = <30>H d7 = <40>H . . . .
d2 = <03>H d5 = <80>H d8 = <40>H . . . .
d3 = <00>H d6 = <00>H d9 = <20>H . . . .

. When font B (9 . 17) is selected.






## ESC m nL nH d1... dk

[Name] Select bit-image mode

[Format] ASCII ESC . m nL nH d1...dk

Hex 1B 2A m nL nH d1...dk

Decimal 27 42 m nL nH d1...dk

[Range] m = 0, 1, 32, 33

0 ≤ nL ≤ 255

0 ≤ nH ≤ 3

0 ≤ d ≤ 255

[Description] Selects a bit-image mode using m for the number of dots specified by nL and nH,

as follows:

| *m* | Mode | Vertical Direction | | Horizontal Direction | |
|---|---|---|---|---|---|
| | | Number of Dots | Dot Density | Dot Density | Number of Data (K) |
| 0 | 8-dot single-density | 8 | 60 DPI | 90 DPI | $nL + nH \times 256$ |
| 1 | 8-dot double-density | 8 | 60 DPI | 180 DPI | $nL + nH \times 256$ |
| 32 | 24-dot single-density | 24 | 180 DPI | 90 DPI | $(nL + nH \times 256) \times 3$ |
| 33 | 24-dot double-density | 24 | 180 DPI | 180 DPI | $(nL + nH \times 256) \times 3$ |

[Notes]

. If the values of m is out of the specified range, nL and data following are processed as normal data.

. The nL and nH indicate the number of dots of the bit image in the horizontal direction. The number of dots is calculated by nL + nH . 256.

. If the bit-image data input exceeds the number of dots to be printed on a line, the excess data is ignored.

. d indicates the bit-image data. Set a corresponding bit to 1 to print a dot or to 0 to not print a dot.

. If the width of the printing area set by **GS L** and **GS W** less than the width required by the data sent with the **ESC** . command, the following will be performed on the line in question (but the printing cannot exceed the maximum printable area):

①The width of the printing area is extended to the right to accommodate the amount of data.

②If step ①does not provide sufficient width for the data, the

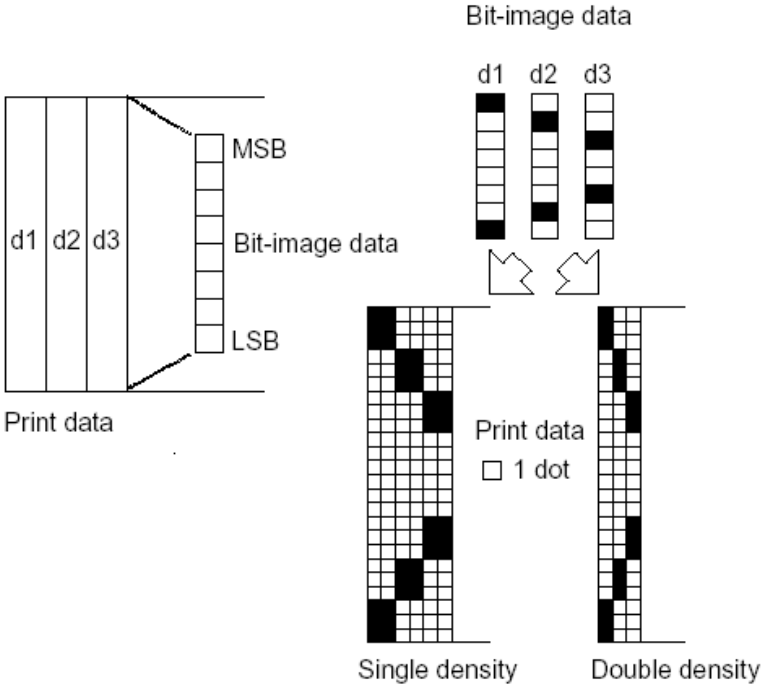
left margin is reduced to accommodate the data.

. After printing a bit image, the printer returns to normal data processing mode.

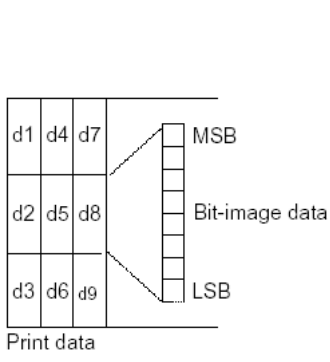
. This command is not affected by print modes (emphasized, double-strike, underline, character size or white/black reverse printing), except upside-down printing mode.

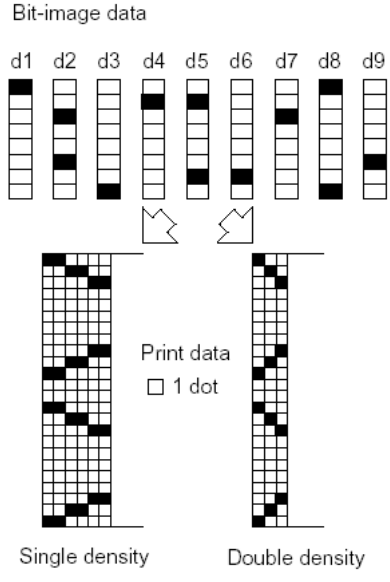
. The relationship between the image data and the dots to be printed is as follows:

. When 8-dot bit image is selected:



. When 24-dot bit image is selected:




## ESC – n

[Name] Turn underline mode on/off

[Format] ASCII ESC - n
Hex 1B 2D n
Decimal 27 45 n

[Range] 0 . n . 2, 48 . n . 50

[Description] Turns underline mode on or off, based on the following values of n:

| *n* | Function |
|---|---|
| 0, 48 | Turns off underline mode |
| 1, 49 | Turns on underline mode (1-dot thick) |
| 2, 50 | Turns on underline mode (2-dots thick) |

[Notes]

. The printer can underline all characters (including right-side character spacing),but cannot underline the space set by **HT.**

. The printer cannot underline 90 . clockwise rotated characters and white/black inverted characters.

. When underline mode id turned off by setting the value of n to 0 or 48, the following data is not underlined, and the underline thickness set before the mode is turned off does not change. The default underline thickness is 1 dot.

. Changing the character size does not affect the current underline thickness.

. Underline mode can also be turned on or off by using **ESC !**. Note, however, that the last received command is effective.

. This command does not affect the setting of Chinese characters.

[Default] n = 0

[Reference] **ESC !**

## ESC 2

[Name] Select default line spacing

[Format] ASCII ESC 2

Hex 1B 32

Decimal 27 50

[Description] Selects 1/6-inch line (approximately 4.23mm) spacing.

[Notes] . The line spacing can be set independently in standard mode and in page mode.

[Reference] **ESC 3**

## ESC 3 n

[Name] Set line spacing

[Format] ASCII ESC 3 n

Hex 1B 33 n

Decimal 27 51 n

[Range] 0 . n . 255

[Description] Sets the line spacing to [ n . vertical or horizontal motion unit] inches.

[Notes]

. The line spacing can be set independently in standard mode and in page mode.

. The horizontal and vertical motion unit are specified by **GS P**. Changing the horizontal or vertical motion unit does not affect the current line spacing.

. The **GS P** command can change the horizontal (and

vertical) motion unit. However, the value cannot be less than the minimum vertical movement amount, and it must be in even units of the minimum vertical movement amount.

. In standard mode, the vertical motion unit (y) is used.

. In page mode, this command functions as follows, depending on the starting position of the printable area:

① When the starting position is set to the upper left or lower right of the printable area using **ESC T**, the vertical motion unit (y) is used.

② When the starting position is set to the upper right or lower left of the printable area using **ESC T**, the horizontal motion unit ( x) is used.

. The maximum paper feed amount is 1016 mm (40 inches). Even if a paper feed amount of more than 1016 mm (40 inches) is set, the printer feeds the paper only 1016 mm (40 inches).

[Default] Line spacing equivalent to approximately 4.23mm (1/6 inches).

[Reference] **ESC 2**, **GS P**

## ESC = n

[Name] Set peripheral device

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | = | n |
| Hex | 1B | 3D | n |
| Decimal | 27 | 61 | n |

[Range] 1 . n . 3

[Description] Selects device to which host computer sends data, using n as follows:

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Printer disabled. |
| | On | 01 | 1 | Printer enabled |
| 1-7 | - | - | - | Undefined. |

[Notes]

. When the printer is disabled, it ignores all data except for error-recovery commands (**DLE EOT, DLE ENQ, DLE DC4**) until it is enabled by this command.

[Default] n = 1

## ESC ? n

[Name] Cancel user-defined characters

[Format] ASCII ESC ? n
Hex 1B 3F n
Decimal 27 63 n

[Range] 32 . n . 126

[Description] Cancels user-defined characters.

[Notes]

. This command cancels the pattern defined for the character code specified by n. After the user-defined characters is canceled, the corresponding pattern for the internal character is printed.

. This command deletes the pattern defined for the specified

code in the font selected by **ESC !**.

. If a user-defined character has not been defined for the specified character code, the printer ignores this command.

[Reference] **ESC &**, **ESC %**

## ESC @

[Name] Initialize printer

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | @ |
| Hex | 1B | 40 |
| Decimal | 27 | 64 |

[Description] Clears the data in the print buffer and resets the printer mode to the mode that was in effect when the power was turned on.

[Notes] . The DIP switch settings are not checked again.
. The data in the receive buffer is not cleared.
. The macro definition is not cleared.
. The NV bit image data is not cleared.
. The data of the user NV memory is not cleared.

## ESC D n1...nk NUL

[Name] Set horizontal tab positions

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | D | n1...nk NUL |
| Hex | 1B | 44 | n1...nk 00 |
| Decimal | 27 | 68 | n1...nk 0 |

[Range] 1 . n . 255; 0 . k . 32

[Description] Sets horizontal tab positions.

. n specifies the column number for setting a horizontal tab position from the beginning of the line.

. k indicates the total number of horizontal tab positions to be set.

[Notes]

. The horizontal tab position is stored as a value of [character width . n] measured from the beginning of the line. The character width includes the right-side character spacing, and double-width characters are set with twice the width of normal characters.

. This command cancels the previous horizontal tab settings.

. When setting n = 8, the print position is moved to column 9 by sending **HT**.

. Up to 32 tab positions ( k = 32) can be set. Data exceeding 32 tab positions is processed as normal data.

. Transmit [ n] k in ascending order and place a NUL code 0 at the end.

. When [ n] k is less than or equal to the preceding value [ n] k-1, tab setting is finished and the following data is processed as normal data.

. **ESC D NUL** cancels all horizontal tab positions.

. The previously specified horizontal tab positions do not change, even if the character width changes.

. The character width is memorized for each standard and

page mode.
[Default] The default tab positions are at intervals of 8 characters (columns 9, 17, 25,...) for
font A (12 ˙ 24).
[Reference] **HT**

## ESC E n

[Name] Turn emphasized mode on/off
[Format] ASCII ESC E n
Hex 1B 45 n
Decimal 27 69 n
[Range] 0 ˙ n ˙ 255
[Description] Turns emphasized mode on or off
When the LSB of n is 0, emphasized mode is turned off.
When the LSB of n is 1, emphasized mode is turned on.
[Notes] ˙ Only the least significant bit of n is enabled.
˙ This command and **ESC !** turn on and off emphasized mode in the same way.
Be careful when this command is used with **ESC !**.
[Default] n = 0
[Reference] **ESC !**

## ESC G n

[Name] Turn on/off double-strike mode
[Format] ASCII ESC G n
Hex 1B 47 n

Decimal 27 71 n

[Range] 0 ≤ n ≤ 255

[Description] Turns double-strike mode on or off.

. When the LSB of n is 0, double-strike mode is turned off.

. When the LSB of n is 1, double-strike mode is turned on.

[Notes] . Only the lowest bit of n is enabled.

. Printer output is the same in double-strike mode and in emphasized mode.

[Default] n = 0

[Reference] **ESC E**

## ESC J n

[Name] Print and feed paper

[Format] ASCII ESC J n

Hex 1B 4A n

Decimal 27 74 n

[Range] 0 ≤ n ≤ 255

[Description] Prints the data in the print buffer and feeds the paper [ n × vertical or horizontal motion unit] inches.

[Notes]

. After printing is completed, this command sets the print starting position to the beginning of the line.

. The paper feed amount set by this command does not affect the values set by **ESC 2** or **ESC 3**.

. The horizontal and vertical motion unit are specified by **GS P**.

. The **GS P** command can change the vertical (and horizontal) motion unit. However, the value cannot be less than the minimum vertical movement amount, and it must be in even units of the minimum vertical movement amount.

. In standard mode, the printer uses the vertical motion unit ( y).

. In page mode, this command functions as follows, depending on the starting position of the printable area:

① When the starting position is set to the upper left or lower right of the printable area using **ESC T**, the vertical motion unit (y) is used.

② When the starting position is set to the upper right or lower left of the printable area using **ESC T**, the horizontal motion unit ( x) is used.

. The maximum line spacing is 1016mm (40 inches). When the setting value exceeds the maximum, it is converted to the maximum automatically.

[Reference] **GS P**

## ESC L

[Name] Select page mode

[Format]

| | | |
|---|---|---|
| ASCII | ESC | L |
| Hex | 1B | 4C |
| Decimal | 27 | 76 |

[Description] Switches from standard mode to page mode.

[Notes]

. This command is enabled only when processed at the beginning of a line in standard mode.

. This command has no effect in page mode.

. After printing by **FF** is completed or by using **ESC S**, the printer returns to standard mode.

. This command sets the position where data is buffered to the position specified by **ESC T** within the printing area defined by **ESC W**.

. This command switches the settings for the following commands (in which the values can be set independently in standard mode and page mode) to those for page mode:

①Set right-side character spacing: **ESC SP, FS S**

②Select default line spacing: **ESC 2, ESC 3**

. Only valve settings is possible for the following commands in page mode; these commands are not executed.

①Turn 90 . clockwise rotation mode on/off: **ESC V**

②Select justification: **ESC a**

③Turn upside-down printing mode on/off: **ESC {**

④Set left margin: **GS L**

⑤Set printable area width: **GS W**

The following command is ignored in page mode:

①Execute test print: **GS ( A**

. The following command is not available in page mode:

①Print NV bit image: **FS p**

②Define NV bit image: **FS q**

③Write to user NV memory: **FS g 1**

④Print raster bit image: **GS v 0**

. The printer returns to standard mode when power is turned on, the printer is reset, or **ESC @** is used.

[Reference] **FF**, **CAN**, **ESC FF**, **ESC S**, **ESC T**, **ESC W**, **GS $**, **GS **

## ESC M n

[Name] Select character font

[Format]

| ASCII | ESC | M | n |
|---|---|---|---|
| Hex | 1B | 4D | n |
| Decimal | 27 | 77 | n |

[Range] n = 0, 1, 48, 49

[Description] Selects character fonts.

| n | Function |
|---|---|
| 0,48 | Character font A (12 × 24) selected. |
| 1,49 | Character font B (9 × 17) selected. |
| 2,50 | User-defined character selected. |
| 3,51 | Chinese character (24 × 24) selected. |

## ESC S

[Name] Select standard mode

[Format]

| ASCII | ESC | S |
|---|---|---|
| Hex | 1B | 53 |
| Decimal | 27 | 83 |

[Description] Switches from page mode to standard mode.

[Notes]

. This command is effective only in page mode.
. Data buffered in page mode are cleared.
. This command sets the print position to the beginning of the line.
. The printing area set by **ESC W** are initialized.
. This command switches the settings for the following commands (in which the values can be set independently in standard mode and page mode) to those for standard mode:
①Set right-side character spacing: **ESC SP, FS S**
②Select default line spacing: **ESC 2, ESC 3**
. The following commands are enabled only to set in standard mode.
①Set printing area in page mode: **ESC W**
②Select print direction in page mode: **ESC T**
. The following commands are ignored in standard mode.
①Set absolute vertical print position in page mode: **GS $**
②Set relative vertical print position in page mode: **GS **
. Standard mode is selected automatically when power is turned on, the printer is reset, or command **ESC @** is used.
[Reference] **FF**, **ESC FF**, **ESC L**

## ESC T n

[Name] Select print direction in page mode

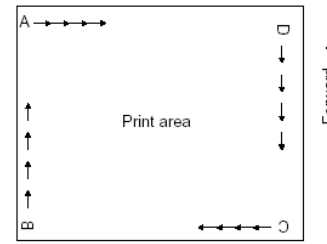
| [Format] | ASCII | ESC | T | n |
|---|---|---|---|---|
| | Hex | 1B | 54 | n |
| | Decimal | 27 | 84 | n |

[Range] 0 ≦ n ≦ 3; 48 ≦ n ≦ 51

[Description] Selects the print direction and starting position in page mode.

n specifies the print direction and starting position as follows:

| *n* | Print Direction | Starting Position |
|---|---|---|
| 0, 48 | Left to right | Upper left (A in the figure) |
| 1, 49 | Bottom to top | Lower left (B in the figure) |
| 2, 50 | Right to left | Lower right (C in the figure) |
| 3, 51 | Top to bottom | Upper right (D in the figure) |




[Notes]

· When the command is input in standard mode, the printer executes only internal flag operation. This command does not affect printing in standard mode.

· This command sets the position where data is buffered within the printing area set by **ESC W**.

· Parameters for horizontal or vertical motion units ( x or y) differ as follows, depending on the starting position of the printing area:

① If the starting position is the upper left or lower right of the printing area, data is buffered in the direction perpendicular to the paper feed direction: Commands using horizontal motion units: **ESC SP**, **ESC $**, **ESC ** Commands using vertical motion units: **ESC 3**, **ESC J**, **GS $**, **GS **

② If the starting position is the upper right or lower left of the

printing area, data is buffered in the paper feed direction: Commands using horizontal motion units: **ESC 3**, **ESC J**, **GS $**, **GS ** Commands using vertical motion units: **ESC SP**, **ESC $**, **ESC **

[Default] n = 0

[Reference] ESC $, ESC L, ESC W, ESC \, GS $, GS P, GS \

## ESC V n

[Name] Turn 90 ° clockwise rotation mode on/off

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | V | n |
| Hex | 1B | 56 | n |
| Decimal | 27 | 86 | n |

[Range] 0 ≤ n ≤ 1, 48 ≤ n ≤ 49

[Description] Turns 90 ° clockwise rotation mode on/off

n is used as follows:

| *n* | Function |
|---|---|
| 0, 48 | Turns off 90° clockwise rotation mode |
| 1, 49 | Turns on 90° clockwise rotation mode |

[Notes]

° This command affects printing in standard mode. However, the setting is always effective.

° When underline mode is turned on, the printer does not underline 90 ° clockwise-rotated.

° Double-width and double-height commands in 90 ° rotation mode enlarge characters in the opposite directions from

double-height and double- width commands in normal mode.
[Default] n = 0
[Reference] **ESC !, ESC~**

## ESC W xL xH yL yH dxL dxH dyL dyH

[Name] Set printing area in page mode
[Format] ASC II ESC W xL xH yL yH dxL dxH dyL dyH
Hex 1B 57 xL xH yL yH dxL dxH dyL dyH
Decimal 27 87 xL xH yL yH dxL dxH dyL dyH
[Range] 0 ≤ xL, xH, yL, yH, dxL, dxH, dyL, dyH ≤ 255 (except dxL= dxH=0 or dyL= dyH=0)
[Description]
· The horizontal starting position, vertical starting position, printing area width, and printing area height are defined as x0, y0, dx (inch), dy (inch), respectively. Each setting for the printing area is calculated as follows:
x0 = [( xL + xH × 256) × (horizontal motion unit)]
y0 = [( yL + yH × 256) × (vertical motion unit)]
dx = [ dxL + dxH × 256) × (horizontal motion unit)]
dy = [ dyL + dyH × 256) × (vertical motion unit)]
The printing area is set as shown in the figure below.
[Notes]

. If this command is input in standard mode, the printer executes only internal flag operation. This command does not affect printing in standard mode.

. If the horizontal or vertical starting position is set outside the printable area, the printer stops command processing and processes the following data as normal data.

. If the printing area width or height is set to 0, the printer stops command processing and processes the following data as normal data.

. This command sets the position where data is buffered to the position specified by **ESC T** within the printing area.

. If (horizontal starting position + printing area width) exceeds the printable area, the printing area width is automatically set to (horizontal printable area- horizontal starting position).

. If (vertical starting position + printing area height) exceeds the printable area, the printing area height is automatically set to (vertical printable area – vertical starting position).

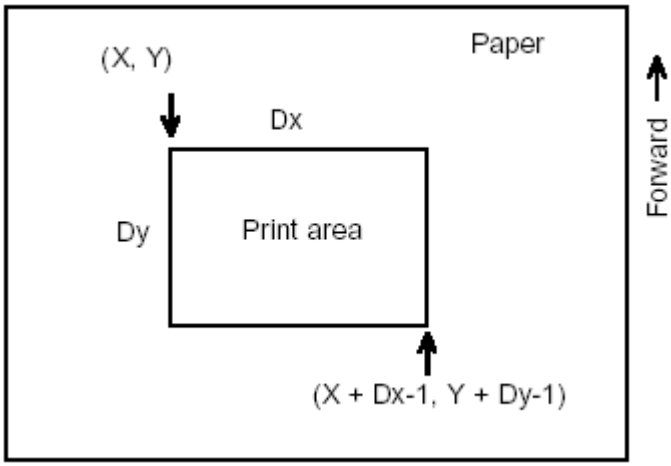
. The horizontal and vertical motion unit are specified by **GS P**. Changing the horizontal or vertical motion unit does not affect the current printing area.

. The **GS P** command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of minimum horizontal movement amount.

. Use the horizontal motion unit ( x) for setting the horizontal

starting position and printing area width, and use the vertical motion unit ( y) for setting the vertical starting position and printing area height.

. When the horizontal starting position , vertical starting position, printing area width, and printing area height are defined as X, Y, Dx, and Dy respectively, the printing area is set as shown in the figure below.




. This printable area for this printer is approximately 72.2 mm (512/180 inches) (for 58 mm paper width mode; 50.8 mm (360/180 inches)) in the horizontal direction and approximately 117.3 mm (1662/360 inches) in the vertical direction.

[Default] xL = xH = yL = yH = 0

dxL = 0, dxH = 2, dyL = 126, dyH = 6

For 58 mm paper width model;

dxL = 104, dxH = 1

[Reference] **CAN**, **ESC L**, **ESC T**, **GS P**

## ESC \ nL nH

[Name] Set relative print position

[Format] ASCII ESC \ nL nH

Hex 1B 5C nL nH

Decimal 27 92 nL nH

[Range] 0 ≤ nL ≤ 255;0 ≤ nH ≤ 255

[Description] Sets the print starting position based on the current position by using the horizontal or vertical motion unit.

· This command sets the distance from the current position to [( nL + nH × 256) × horizontal or vertical motion unit]

[Notes]

· Any setting that exceeds the printable area is ignored.

· When pitch N is specified to the right: nL+ nH × 256 = N

When pitch N is specified to the left (the negative direction), use the complement of 65536.

When pitch N is specified to the left: nL+ nH × 256 = 65536 - N

· The print starting position moves from the current position to [ N × horizontal or vertical motion unit]

· The horizontal and vertical motion unit are specified by **GS P**.

· The **GS P** command can change the horizontal (and

vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.

. In standard mode, the horizontal motion unit is used.

. In page mode, the horizontal or vertical motion unit differs as follows, depending on the starting point of the printing area:

①When the starting position is set to the upper left or lower right of the printable area using **ESC T**, the horizontal motion unit ( x) is used.

②When the starting position is set to the upper right or lower left of the printable area using **ESC T**, the vertical motion unit ( y) is used.

[Reference] **ESC $**, **GS P**

## ESC a n

[Name] Select justification

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | a | n |
| Hex | 1B | 61 | n |
| Decimal | 27 | 97 | n |

[Range] 0 . n . 2, 48 . n . 50

[Description] Aligns all the data in one line to the specified position, n selects the justification as follows:

| *n* | **Justification** |
|---|---|
| 0,48 | Left justification |
| 1, 49 | Centering |
| 2, 50 | Right justification |

[Notes]

. The command is enabled only when processed at the beginning of the line in standard mode.

. If this command is input in page mode, the printer performs only internal flag operations.

. This command has no effect in page mode.

. This command executes justification in the printing area.

. This command justifies the space area according to **HT, ESC $** or **ESC **.

[Default] n = 0

[Example]

Left justification

```
ABC
ABCD
ABCDE
```

Centering

```
 ABC
 ABCD
ABCDE
```

Right justification

```
  ABC
 ABCD
ABCDE
```

## ESC c 0 n

[Name] Select paper type

[Format]

| | | | | | |
|---|---|---|---|---|---|
| ASCII | ESC | c | 0 | n |
| Hex | 1B | 63 | 30 | n |
| Decimal | 27 | 99 | 40 | n |

[Range] 0 ﹒n ﹒2

[Description] Select paper type.

n = 0, select common paper;

n = 1,2, select black mark paper.

n selects the justification as follows:

[Notes]

﹒Black mark paper is the paper with black mark.

﹒When black mark paper is selected, please don't use common paper, otherwise the printer will feed paper continuously by GS FF. When common paper is selected, please don't use black mark paper, otherwise the paper will alarm paper out.

[Default] n = 0

[Reference] **GS FF**

## ESC c 3 n

[Name] Select paper sensor(s) to output paper end signals

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | ESC | c | 3 | n |
| Hex | 1B | 63 | 33 | n |
| Decimal | 27 | 99 | 51 | n |

[Range] 0 ﹒n ﹒255

[Description] Selects the paper sensor(s) to output paper end signals

﹒Each bit of n is used as follows:

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Paper roll near-end sensor disabled |
| | On | 01 | 1 | Paper roll near-end sensor enabled |
| 1 | Off | 00 | 0 | Paper roll near-end sensor disabled |
| | On | 02 | 2 | Paper roll near-end sensor enabled |
| 2 | Off | 00 | 0 | Paper roll end sensor disabled |
| | On | 04 | 4 | Paper roll end sensor enabled |
| 3 | Off | 00 | 0 | Paper roll end sensor disabled |
| | On | 08 | 8 | Paper roll end sensor enabled |
| 4-7 | - | - | - | Undefined |

[Notes]

. It is possible to select multiple sensors to output signals. Then, if any of the sensors detects a paper end, the paper end signal is output.

. The command is available only with a parallel interface and is ignored with a serial interface.

. Sensor is switched when executing this command. The paper end signal switching be delayed depending on the receive buffer state.

. If either bit 0 or bit 1 is on, the paper roll near-end sensor is selected as the paper sensor outputting paper-end signals

. If either bit 2 or bit 3 is on, the paper roll end sensor is selected as the paper sensor outputting paper-end signals.

. When all the sensors are disabled, the paper end signal always outputs a paper present status.

[Default] n = 15

## ESC c 4 n

[Name] Select paper sensor(s) to stop printing

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | ESC | c | 4 | n |
| Hex | 1B | 63 | 34 | n |
| Decimal | 27 | 99 | 52 | n |

[Range] 0 ≦ n ≦ 255

[Description] Selects the paper sensor(s) used to stop printing when a paper-end is detected, using n as follows:

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Paper roll near end sensor disabled. |
| | On | 01 | 1 | Paper roll near end sensor enabled. |
| 1 | Off | 00 | 0 | Paper roll near end sensor disabled. |
| | On | 02 | 2 | Paper roll near end sensor enabled. |
| 2-7 | - | - | - | Undefined. |

[Notes]

- When a paper sensor is enabled with this command, printing is stopped only when the corresponding paper is selected for printing.
- When a paper-end is detected by the paper roll sensor, the printer goes off-line after printing stops.
- When either bit 0 or 1 is on, the printer selects the paper roll near-end sensor for the paper sensor to stop printing.

[Default] n = 0

## ESC c 5 n

[Name] Enable/disable panel buttons

[Format] ASCII ESC c 5 n
Hex 1B 63 35 n
Decimal 27 99 53 n

[Range] 0 ≤ n ≤ 255

[Description] Enables or disables the panel buttons.

- When the LSB of n is 0, the panel buttons are enabled.
- When the LSB of n is 1, the panel buttons are disabled.

[Notes]

- Only the lowest bit of n is valid.
- When the panel buttons are disabled, none of them are usable when the printer cover is closed.
- In this printer, the panel buttons are the FEED button.
- In the macro ready mode, the FEED button are enabled regardless of the settings of this command; however, the paper cannot be fed by using these buttons.

[Default] n = 0

## ESC d n

[Name] Print and feed n lines

[Format] ASCII ESC d n
Hex 1B 64 n
Decimal 27 100 n

[Range] 0 ≤ n ≤ 255

[Description] Prints the data in the print buffer and feeds n lines.

[Notes]

. This command sets the print starting position to the beginning of the line.

. This command does not affect the line spacing set by **ESC 2** or **ESC 3**.

. The maximum paper feed amount is 1016 mm (40 inches). If the paper feed amount ( nx line spacing) of more than 1016 mm (40 inches) is specified, the printer feeds the paper only 1016 mm (40 inches).

[Reference] **ESC 2**, **ESC 3**

## ESC p m t1 t2

[Name] Generate Drawer kick-out connector pulse

[Format] ASCII ESC p m t1 t2
Hex 1B 70 m t1 t2
Decimal 27 112 m t1 t2

[Range] m = 0, 1, 48, 49; 0 . t1 . 255, 0 . t2 . 255

[Description] Outputs the pulse specified by t1 and t2 to connector pin m as follows:

| *m* | **Connector pin** |
|---|---|
| 0, 48 | Drawer kick-out connector pin 2. |
| 1, 49 | Drawer kick-out connector pin 5. |

[Notes]

. The pulse ON time is [ t1 . 2 ms] and the OFF time is [ t2 . 2 ms].

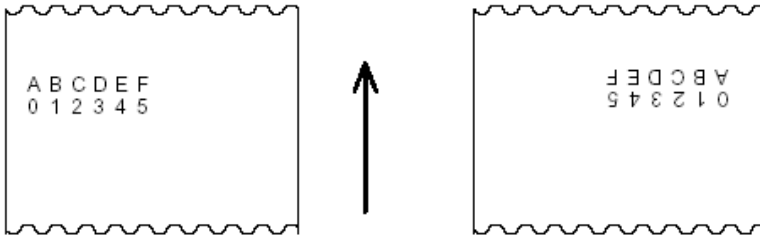
. If t2 < t1, the OFF time is [ t1 . 2 ms]
[Reference] **DLE DC4**

## ESC { n

[Name] Turns on/off upside-down printing mode
[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | { | n |
| Hex | 1B | 7B | n |
| Decimal | 27 | 123 | n |

[Range] 0 . n . 255
[Description] Turns upside-down printing mode on or off.
. When the LSB of n is 0, upside-down printing mode is turned off.
. When the LSB of n is 1, upside-down printing mode is turned on.
[Notes]
. Only the lowest bit of n is valid.
. This command is enabled only when processed at the beginning of a line in standard mode.
. When this command is input in page mode, the printer performs only internal flag operations.
. This command does not affect printing in page mode.
. In upside-down printing mode, the printer rotates the line to be printed by 180 . and then prints it.
[Default] n = 0
[Example]




Paper feed direction

## FS p n m

[Name] Print NV bit image

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | FS | p | n | m |
| Hex | 1C | 70 | n | m |
| Decimal | 28 | 112 | n | m |

[Range] 1 ≤ n ≤ 255; 0 ≤ m ≤ 3 , 48 ≤ m ≤ 51

[Description] Prints a NV bit image n using the mode specified by m.

| *m* | Mode | Vertical Dot Density (DPI) | Horizontal Dot Density (DPI) |
|---|---|---|---|
| 0.48 | Normal | 180 | 180 |
| 1.49 | Double-width | 180 | 90 |
| 2.50 | Double-height | 90 | 180 |
| 3.51 | Quadruple | 90 | 90 |

- n is the number of the NV bit image (defined using the **FS q** command).
- m specifies the bit image mode.

[Detail]

- NV bit image means a bit image which is defined in a non-volatile memory by **FS q** and printed by **FS p**.

. This command is not effective when the specified NV bit image has not been defined.

. In standard mode, this command is effective only when there is no data in the print buffer.

. In page mode, this command is not effective.

. This command is not affected by print modes (emphasized, double-strike, underline, character size, white/black reverse printing, or 90 . rotated characters, etc.), except upside-down printing mode.

. If the printing area width set by **GS L** and **GS W** for the NV bit image is less than one vertical line, the following processing is performed only on the line in question. However, in NV bit image mode, one vertical line means 1 dot in normal mode (m 0, 48) and in double-height mode (m 2, 50), and it means 2 dots in double-width mode (m 1, 49) and in quadruple mode (m 3, 51).

①The printing area width is extended to the right in NV bit image mode up to one line vertically. In this case, printing does not exceed the printable area.

②If the printing area width cannot be extended by one line vertically, the left margin is reduced to accommodate one line vertically.

. If the downloaded bit-image to be printed exceeds one line, the excess data is not printed.

. This command feeds dots (for the height n of the NV bit-image) in normal and double-width modes, and (for the

height n ¡ 2 of the NV bit-image) in doubleheight and quadruple modes, regardless of the line spacing specified by **ESC 2** or **ESC 3**.

¡ After printing the bit image, this command sets the print position to the beginning of the line and processes the data that follows as normal data.

[References] **ESC ¡, FS q, GS /, GS v 0**

**FS q n [xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]n**

[Name] Define NV bit image

[Format] ASCII FS q n [xL xH yL yH d1...dk]1...[ xL xH yL yH d1...dk]n

Hex 1C 71 n [xL xH yL yH d1...dk]1...[ xL xH yL yH d1...dk]n

Decimal 28 113 n [xL xH yL yH d1...dk]1...[ xL xH yL yH d1...dk]n

[Range] 1 ¡ n ¡ 255

0 ¡ xL ¡ 255

0 ¡ xH ¡ 3 (when 1 ¡ ( xL+ xH ¡ 256) ¡ 1023

0 ¡ yL ¡ 1 (when 1 ¡ ( yL+ yH ¡ 256) ¡ 288

0 ¡ d ¡ 255

k = ( xL+ xH ¡ 256) ¡ ( yL+ yH ¡ 256) ¡ 8

Total defined data area = 2M bits (256K bytes)

[Description] Define the NV bit image specified by n .

¡ n specifies the number of the defined NV bit image.

¡ xL, xH specifies ( xL+ xH ¡ 256) ¡ 8 dots in the horizontal

direction for the NV bit image you are defining.
. yL, yH specifies ( yL, yH . 256) . 8 dots in the vertical direction for the NV bit image you are defining.
[Notes]
. Frequent write command execution may cause damage the NV memory. Therefore, it is recommended to write the NV memory 10 times or less a day.
. The printer performs a hardware reset after the procedure to place the image into the NV memory. Therefore, user-defined characters, downloaded bit images, and macros should be defined only after completing this command. The printer clears the receive and print buffers and resets the mode to the mode that was in effect at power on. At this time, DIP switch settings are checked again.
. This command cancels all NV bit images that have already been defined by this command. The printer can not redefine only one of several data definitions previously defined. In this case, all data needs to be sent again.
. From the beginning of the processing of this command till the finish of hardware reset, mechanical operations (including initializing the position of the printer head when the cover is open, paper feeding by using the FEED button, etc.) cannot be performed.
. During processing this command, the printer is in BUSY when writing the data to the user NV memory and stops receiving data. Therefore it is prohibitted to transmit the data

including the real-time commands during the execution of this command.

. NV bit image means a bit image which is defined in a non-volatile memory by **FS q** and printed by **FS p**.

. In standard mode, this command is effective only when processed at the beginning of the line.

. In page mode, this command is not effective.

. This command is effective when 7 bytes <FS yH> is processed as a normal value.

. When the amount of data exceeds the capacity left in the range defined by xL, xH, yL, yH, the printer processes xL, xH, yL, yH out of the defined range.

. In the first group of NV bit images, when any of the parameters xL, xH, yL, yH is out of the definition range, this command is disabled.

. In groups of NV bit images other than the first one, when the printer processes xL, xH, yL, yH out of the defined range, it stops processing this command and starts writing into the NV images. At this time, NV bit images that haven't been defined are disabled (undefined), but any NV bit images before that are enabled.

. The d indicates the definition data. In data ( d) a 1 bit specifies a dot to be printed and a 0 bit specifies a dot not to be printed.

. This command defines n as the number of a NV bit image. Numbers rise in order from NV bit image 01H. Therefore, the

first data group [xL xH yL yH d1...dk] is NV bit image 01H, and the last data group [xL xH yL yH d1...dk] is NV bit image n. The total agrees with the number of NV bit images specified by command **FS p**.

. A definition data of a NV bit image consists of [xL xH yL yH d1...dk]. Therefore, when only one NV bit image is defined n=1, the printer processes a data group [xL xH yL yH d1...dk] once. The printer uses ([data: ( xL+ xH . 256) . ( yL+ yH . 256) . 8] [header :4]) bytes of NV memory.

. The definition area in this printer is a maximum of 2M bits (256K bytes). This command can define several NV bit images, but cannot define a bit image data whose total capacity [bit image data+ header] exceeds 2M bytes (256K bytes).

. The printer is busy immediately before writing into NV memory, regardless of the setting of DIP switch 2-1.

. The printer does not transmit ASB status and perform status detection during processing of this command even when ASB is specified.

. When this command is received during macro definition, the printer ends macro definition, and begins performing this command.

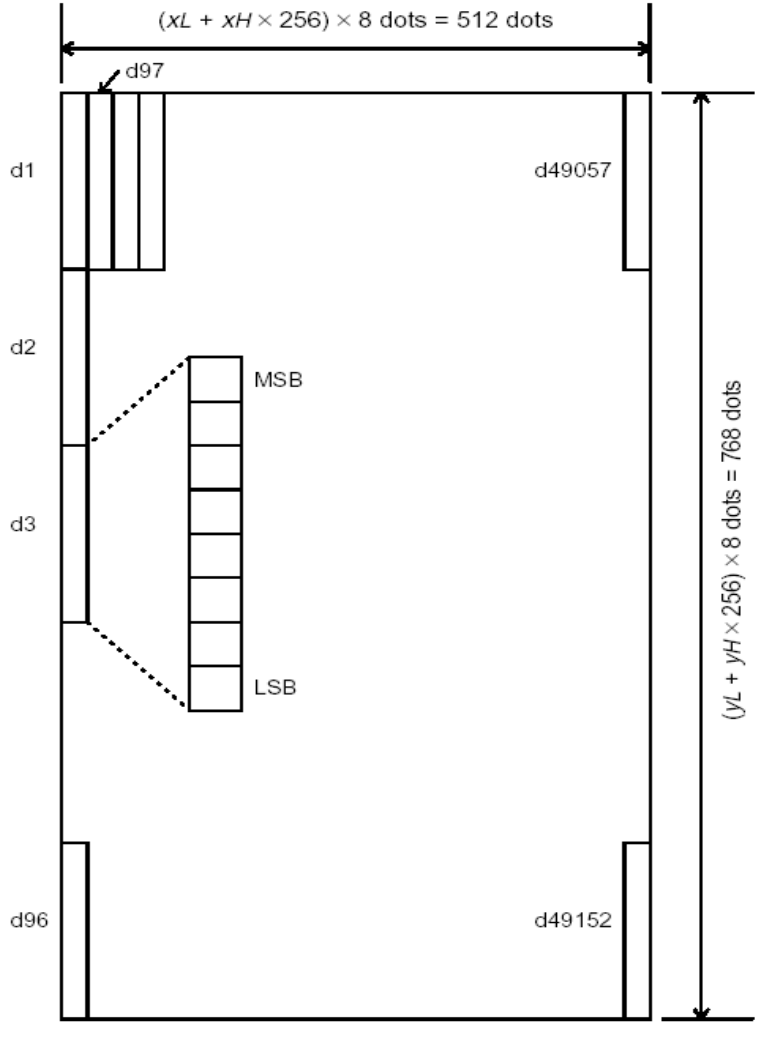
. Once a NV bit image is defined, it is not erased by performing **ESC @**, reset, and power off.

. This command performs only definition of a NV bit image and does not perform printing. Printing of the NV bit image is

performed by the **FS p** command.

[Reference] **FS p**

[Example] When xL = 64, xH = 0, yL = 96, yH = 0


(xL + xH × 256) × 8 dots = 512 dots
d97
d1
d49057
d2
MSB
d3
LSB
d96
d49152
(yL + yH × 256) × 8 dots = 768 dots

## GS FF

[Name] Black mark paper localization

[Format] ASCII GS FF

Hex 1D 0C

Decimal 29 12

[Description] The printer feeds paper to the position of the next black mark.

[Notes]

. This command is only effective for black mark paper.

. When black mark paper is selected, please don't use common paper, otherwise the printer will feed paper continuously.

## GS ! n

[Name] Select character size

[Format] ASCII GS ! n

Hex 1D 21 n

Decimal 29 33 n

[Range] 0 . n . 255 (1 . vertical number of times . 8, 1 . horizontal number of times . 8)

[Description] Selects the character height using bits 0 to 2 and selects the character width using bits 4 to 7, as follows:

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Character height selection. See Table 2. | | | |
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | Character width selection. See Table 1. | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | | | | |

**Table 1**
**Character Width Selection**

| Hex | Decimal | Width |
|---|---|---|
| 00 | 0 | 1 (normal) |
| 10 | 16 | 2 (double-width) |
| 20 | 32 | 3 |
| 30 | 48 | 4 |
| 40 | 64 | 5 |
| 50 | 80 | 6 |
| 60 | 96 | 7 |
| 70 | 112 | 8 |

**Table 2**
**Character Height Selection**

| Hex | Decimal | Height |
|---|---|---|
| 00 | 0 | 1 (normal) |
| 01 | 1 | 2 (double-height) |
| 02 | 2 | 3 |
| 03 | 3 | 4 |
| 04 | 4 | 5 |
| 05 | 5 | 6 |
| 06 | 6 | 7 |
| 07 | 7 | 8 |

[Notes]

. This command is all characters (alphanumeric and Chinese) effective except for HRI characters.

. If n is outside of the defined range, this command is ignored.

. In standard mode, the vertical direction is the paper feed direction, and the horizontal direction is perpendicular to the

paper feed direction. However,when character orientation changes in 90 ° clockwise-rotation mode, the relationship between vertical and horizontal directions is reversed.

° In page mode, vertical and horizontal directions are based on the character orientation.

° When characters are enlarged with different sizes on one line, all the characters on the line are aligned at the baseline.

° The **ESC !** command can also turn double-width and double-height modes on or off. However, the setting of the last received command is effective.

[Default] n = 0

[Reference] **ESC !**

## GS # n

[Name] Define downloaded bit image

[Format]

| | | | |
|---|---|---|---|
| ASCII | GS | # | n |
| Hex | 1D | 23 | n |
| Decimal | 29 | 33 | n |

[Range] 1 ° n ° 8

[Description] Defines a downloaded bit image.

[Notes]

° This command is only effective for the bit image in RAM, and is ineffective for the bit image in FLASH.

° The downloaded bit image definition is cleared when the printer is reset or the power is turned off.

## GS $ nL nH

[Name] Set absolute vertical print position in page mode

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | GS | $ | nL | nH |
| Hex | 1D | 24 | nL | nH |
| Decimal | 29 | 36 | nL | nH |

[Range] 0 ≤ nL ≤ 255, 0 ≤ nH ≤ 255

[Description]

· Sets the absolute vertical print starting position for buffer character data in page mode.

· This command sets the absolute print position to [( nL + nH × 256) × (vertical or horizontal motion unit)] inches.

[Notes]

· This command is effective only in page mode.

· If the [( nL + nH × 256) × (vertical or horizontal motion unit)] exceeds the specified printing area, this command is ignored.

· The horizontal starting buffer position does not move.

· The reference starting position is that specified by **ESC T**.

· This command operates as follows, depending on the starting position of the printing area specified by **ESC T**:

①When the starting position is set to the upper left or lower right, this command sets the absolute position in the vertical direction.

②When the starting position is set to the upper right or lower left, this command sets the absolute position in the horizontal direction.

· The horizontal and vertical motion unit are specified by **GS**

**P**.

. The **GS P** command can change the horizontal and vertical motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.
[Reference] **ESC $**, **ESC T**, **ESC W, ESC **, **GS P, GS **

## GS ( A pL pH n m

[Name] Execute test print
[Format] ASCII GS ( A pL pH n m
Hex 1D 28 41 pL pH n m
Decimal 29 40 65 pL pH n m
[Range] ( pL+( pH 256))=2 (where pL=2, pH=0)
0 . n . 2, 48 . n . 50
1 . m . 3, 49 . m . 51
[Description]
. Executes a test print with a specified test pattern on a specified paper.
. pL and pH specifies the number of the parameter such as n, m to ( pL + ( pH 256)) bytes.
n specifies the paper to be tested.

| *n* | Paper |
|---|---|
| 0, 48 | Basic sheet (paper roll) |
| 1, 49<br>2, 50 | Paper roll |

m specifies a test pattern.

| *m* | Test pattern |
|---|---|
| 1, 49 | Hexadecimal dump |
| 2, 50 | Printer status print |
| 3, 51 | Rolling pattern print |

[Description]

. This command is enabled only when processed at the beginning of a line in standard mode.

. This command is no effect in page mode.

. When this command is received during macro definition, the printer ends macro definition and begins performing this command.

. After the test print is finished, the printer resets itself automatically. Therefore, the already-defined data before this command is executed, such as an user defined characters, downloaded bit image, and macro, becomes undefined, and the receive buffer and print buffer are cleared, and each setting returns to the default value. The printer also re-reads the DIP switch settings.

. The printer cuts the paper at the end of the test print.

. The printer goes BUSY while this command is executed.

## GS x y d1...d(x . y . 8)

[Name] Define downloaded bit image

[Format] ASCII GS . x y d1...d(x . y . 8)

Hex 1D 2A x y d1...d(x . y . 8)

Decimal 29 42 x y d1 ...d(x × y × 8)

[Range] 1 ≤ x ≤ 255

1 ≤ y ≤ 48

x × y ≤ 1536

0 ≤ d ≤ 255

[Description] Defines a downloaded bit image using the number of dots specified by x and y

· x specifies the number of dots in the horizontal direction.

· y specifies the number of dots in the vertical direction.

[Notes]

· The number of dots in the horizontal direction is x × 8, in the vertical direction it is y × 8.

· If x × y is out of the specified range, this command is disabled.

· The d indicates bit-image data. Data ( d) specifies a bit printed to 1 and not printed to 0.

· The downloaded bit image definition is cleared when:

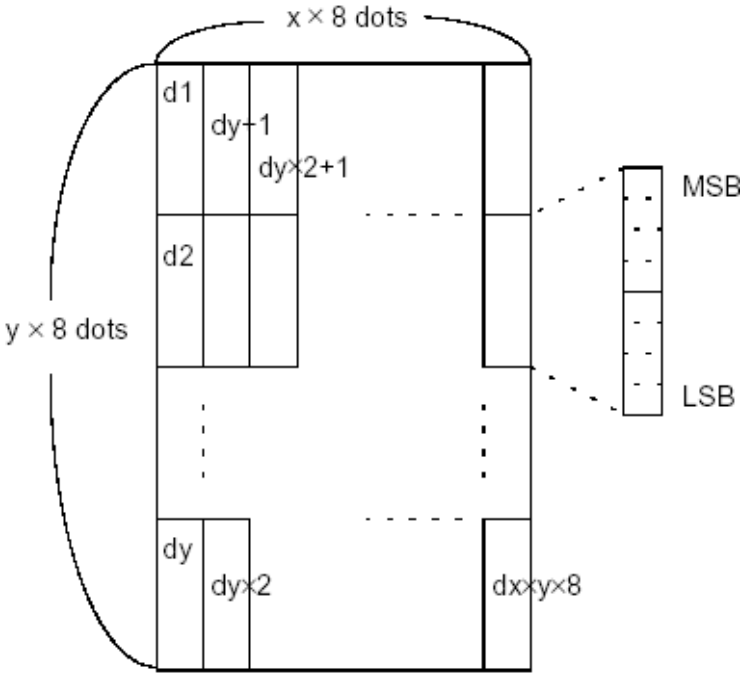
①**ESC @** is executed.

②**ESC &** is executed.

③**FS q** is executed.

④Printer is reset or the power is turned off.

· The following figure shows the relationship between the downloaded bit image and the printed data.




[Reference] **GS /**

## GS / m

[Name] Print downloaded bit image

[Format] ASCII GS / m

Hex 1D 2F m

Decimal 29 47 m

[Range] 0 ≤ m ≤ 3, 48 ≤ m ≤ 51

[Description] Prints a downloaded bit image using the mode

specified by m.

m selects a mode from the table below:

| m | Mode | Vertical Dot Density(DPI) | Horizontal Dot Density(DPI) |
|---|---|---|---|
| 0, 48 | Normal | 180 | 203 |
| 1, 49 | Double-width | 180 | 101 |
| 2, 50 | Double-height | 90 | 203 |
| 3, 51 | Quadruple | 90 | 101 |

[Notes]

. This command is ignored if a downloaded bit image has not been defined.

. In standard mode, this command is effective only when there is no data in the print buffer.

. This command has no effect in the print modes (emphasized, double-strike, underline, character size, or white/black reverse printing), except for upsidedown printing mode.

. If the downloaded bit-image to be printed exceeds the printable area, the excess data is not printed.

. Refer to Figure 3.12.3 for the downloaded bit image development position in page mode.

. If the printing area width set by **GS L** and **GS W** is less

than one line in vertical, the following processing is performed only on the line in question:
①The printing area width is extended to the right up to one line in vertical. In this case, printing does not exceed the printable area.
②If the printing area width cannot be extended by one line in vertical, the left margin is reduced to accommodate one line in vertical.
[Reference] **GS**., **GS #**

## GS :

[Name] Start/end macro definition
[Format] ASCII GS :
Hex 1D 3A
Decimal 29 58
[Description] Starts or ends macro definition.
[Notes]
. Macro definition starts when this command is received during normal operation. Macro definition ends when this command is received during macro definition.
. When **GS ^** is received during macro definition, the printer ends macro definition and clears the definition.
. Macro is not defined when the power is turned on.
. The defined contents of the macro are not cleared by **ESC @**. Therefore, **ESC @** can be included in the contents of the macro definition.

. If the printer receives **GS :** again immediately after previously receiving **GS :** the printer remains in the macro undefined state.

. The contents of the macro can be defined up to 2048 bytes. If the macro definition exceed 2048 bytes, excess data is not stored.

[Reference] **GS ^**

## GS B n

[Name] Turn white/black reverse printing mode

[Format]

| | | | |
|---|---|---|---|
| ASCII | GS | B | n |
| Hex | 1D | 42 | n |
| Decimal | 29 | 66 | n |

[Range] 0 . n . 255

[Description] Turns on or off white/black reverse printing mode.

. When the LSB of n is 0, white/black reverse mode is turned off.

. When the LSB of n is 1, white/black reverse mode is turned on.

[Notes]

. Only the lowest bit of n is valid.

. This command is available for built-in characters and user-defined characters.

. When white/black reverse printing mode is on, it also applied to character spacing set by **ESC SP**.

. This command does not affect bit image, user-defined bit image, bar code, HRI characters, and spacing skipped by **HT**, **ESC $**, and **ESC **.

. This command does not affect the space between lines.

. White/black reverse mode has a higher priority than underline mode. Even if underline mode is on, it is disabled (but not canceled) when white/black reverse mode is selected.

[Default] n = 0

## GS H n

[Name] Select printing position for HRI characters

[Format]

| ASCII | GS | H | n |
|---|---|---|---|
| Hex | 1D | 48 | n |
| Decimal | 29 | 72 | n |

[Range] 0 . n . 3, 48 . n . 51

[Description] Selects the printing position of HRI characters when printing a bar code.

n selects the printing position as follows:

| *n* | **Printing position** |
|---|---|
| 0, 48 | Not printed |
| 1, 49 | Above the bar code |
| 2, 50 | Below the bar code |
| 3, 51 | Both above and below the bar code |

. HRI indicates Human Readable Interpretation.

[Notes] . HRI characters are printed using the font specified

by **GS f**.
[Default] n = 0
[Reference] **GS f**, **GS k**

## GS I n

[Name] Transmit printer ID
[Format] ASCII GS I n
Hex 1D 49 n
Decimal 29 73 n
[Range] 1 ≤ n ≤ 3, 49 ≤ n ≤ 51, 65 ≤ n ≤ 69
[Description] Transmits the printer ID specified by n as follows:

| n | Printer ID | **Specification** | **ID (hexadecimal)** |
|---|---|---|---|
| 1,49 | Printer model ID | SP-POS88IV series | 20 |
| 2,50 | Printer model ID | See table below | |
| 3,51 | ROM version ID | Depends on ROM version | |
| 65 | Firmware version ID | Depends on Firmware version | |
| 66 | Manufacturer | SPRT | |
| 67 | Printer name | SP-POS88IV | |
| 68 | Serial number | Depends on serial number | |

| | | |
|---|---|---|
| 69 | Support type | Japan model: KANJI JAPANESE<br>China model: CHINA GB2312<br>Taiwan model：TAIWAN BIG-5<br>Thai model: THAI 3 PASS |

n = 2, Type ID

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Two-byte character code not supported. |
| | On | 01 | 1 | Two-byte character code supported. |
| 1 | On | 02 | 2 | Auto-cutter equipped. |
| 2 | Off | 00 | 0 | No direct connection with customer display |
| 3 | Off | 00 | 0 | No MICR reader. |
| 4 | Off | 00 | 0 | Not used. Fixed to Off. |
| 5 | - | - | - | Undefined. |
| 6 | - | - | - | Undefined. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

[Notes]

. When DTR/DSR control is selected in the serial interface model, the printer transmits only 1 byte after confirming that the host is ready to receive data (DSR signal is SPACE). If the host computer is not ready to receive data (DSR signal is MARK), the printer waits until the host is ready.

. When XON/XOFF control is selected in the serial interface model, the printer transmits only 1 byte without confirming the condition of the DSR signal.

. The printer ID is transmitted when the data in the receive buffer is developed. Therefore, there may be a time lag between receiving this command and transmitting the status,

depending on the receive buffer status.

. When the printer ID transmission is specified with (1 . n . 3) or (49 . n . 51),one byte code is transmitted.

. When Auto Status Back (ASB) is enabled using **GS a**, the status transmitted by **GS** I and the ASB status must be differentiated.

. After the data is ready to be transmitted, the printer executes the following process.

. When the printer ID transmission is specified with (65 . n . 69), the following contents are transmitted:

Header: Hexadecimal = 5FH / Decimal = 95 (1 byte)

Data: Printer information

NUL: Hexadecimal = 00H / Decimal = 0 (1 byte)

①Executes READY to BUSY. If it is already BUSY, the printer executes nothing.

②Transmits [Header + Data + NUL].

③Executes BUSY to READY. If it is already BUSY from any other cause, the printer executes nothing.

## GS L nL nH

[Name] Set left margin

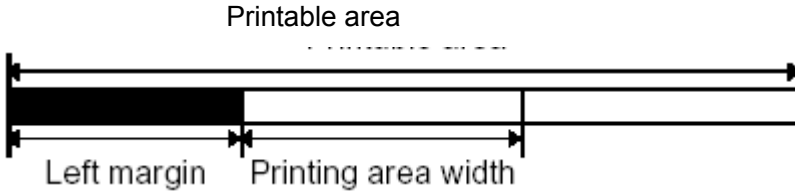
[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | GS | L | nL | nH |
| Hex | 1D | 4C | nL | nH |
| Decimal | 29 | 76 | nL | nH |

[Range] 0 . nL . 255; 0 . nH . 255

[Description] Sets the left margin using nL and nH.

. The left margin is set to [( nL + nH . 256) . horizontal motion unit)] inches.




[Notes]

. This command is effective only processed at the beginning of the line in standard mode.

. If this command is input in page mode, the printer performs only internal flag operations.

. This command does not affect printing in page mode.

. If the setting exceeds the printable area, the maximum value of the printable area is used.

. The horizontal and vertical motion units are specified by **GS P**. Changing the horizontal and vertical motion unit does not affect the current left margin.

. The horizontal motion unit (x) is used for calculating the left margin. The calculated result is truncated to the minimum value of the mechanical pitch.

[Default] nL = 0, nH = 0

[Reference] **GS P**, **GS W**

## GS P x y

[Name] Set horizontal and vertical motion units

[Format] ASCII GS P x y
Hex 1D 50 x y
Decimal 29 80 x y
[Range] 0 ． x ． 255; 0 ． y ． 255
[Description] Sets the horizontal and vertical motion units to approximately 25.4/ x mm { 1/ x inches} and approximately 25.4/ y mm {1/ y inches}, respectively.
When x and y are set to 0, the default setting of each value is used.
[Notes]
． The horizontal direction is perpendicular to the paper feed direction and the vertical direction is the paper feed direction.
． In standard mode, the following commands use x or y, regardless of character rotation (upside-down or 90 ． clockwise rotation):
①Commands using x: **ESC SP**, **ESC $**, **ESC **, **FS S, GS L**, **GS W**
②Commands using y: **ESC 3**, **ESC J**, **GS V**
． In page mode, the following command use x or y, depending on character orientation:
①When the print starting position is set to the upper left or lower right of the printing area using **ESC T** (data is buffered in the direction perpendicular to the paper feed direction):
Commands using x: **ESC SP**, **ESC $**, **ESC W**, **ESC \, FS S**
Commands using y: **ESC 3**, **ESC J**, **ESC W**, **GS $**, **GS **, **GS V**

②When the print starting position is set to the upper right or lower left of the printing area using **ESC T** (data is buffered in the paper feed direction):
Commands using x: **ESC 3**, **ESC J**, **ESC W**, **GS $**, **GS **
Commands using y: **ESC SP**, **ESC $**, **ESC W**, **ESC **,**FS S**, **GS V**

. The command does not affect the previously specified values.

. The calculated result from combining this command with others is truncated to the minimum value of the mechanical pitch.

[Default] x = 180, y = 360
[Reference] **ESC SP**, **ESC $**, **ESC 3**, **ESC J**, **ESC W**, **ESC **, **GS $**, **GS L**, **GS V**, **GS W**, **GS **

## ①GS V m ②GS V m n

[Name] Select cut mode and cut paper

| [Format] | | | | | |
|---|---|---|---|---|---|
| | ①ASCII | GS | V | m | |
| | Hex | 1D | 56 | m | |
| | Decimal | 29 | 86 | m | |
| | ②ASCII | GS | V | m | n |
| | Hex | 1D | 56 | m | n |
| | Decimal | 29 | 86 | m | n |

[Range] ①m =¦49; ②m = 66, 0 . n . 255
[Description] Selects a mode for cutting paper and executes paper cutting. The value of m selects the mode as follows:

| *m* | Print mode |
|---|---|
| 0, 1, 49 | Partial cut (one point left uncut) |
| 66 | Feeds paper (cutting position + [*n* × (vertical motion unit)]), and cuts the paper partially (one point left uncut). |

[Notes for ①and ②]

. This command is effective only processed at the beginning of a line.

[Notes for ②]

. When m = 0,48,1, 49, the printer feeds the paper to the cutting position and cuts it.

. When n = 66, the printer feeds the paper to (cutting position + [ n . vertical motion unit]) and cuts it.

. The horizontal and vertical motion unit are specified by **GS P**.

. The paper feed amount is calculated using the vertical motion unit (y). However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.

## GS W nL nH

[Name] Set printing area width

| [Format] | ASCII | GS | W | nL | nH |
|---|---|---|---|---|---|
| | Hex | 1D | 57 | nL | nH |
| | Decimal | 29 | 87 | nL | nH |

[Range] 0 . nL . 255; 0 . nH . 255

[Description] Sets the printing area width to the area specified

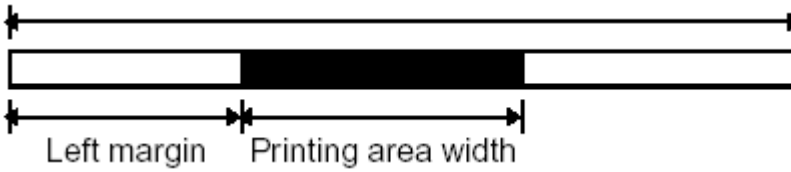
by nL and nH.

. The printing area width is set to [( nL + nH . 256)

. horizontal motion unit)]

inches.

Printable area




[Notes]

. This command is effective only processed at the beginning of the line.

. In page mode, the printer performs only internal flag operations.

. This command does not affect printing in page mode.

. If the [left margin + printing area width] exceeds the printable area, [printable area width - left margin) is used.

. The horizontal and vertical motion units are specified by **GS P**. Changing the horizontal and vertical motion units does not affect the current left margin.

. The horizontal motion unit is used for calculating the printing area width. The calculated result is truncated to the minimum value of the mechanical pitch.

[Default] nL = 76, nH = 2

[Reference] **GS L**, **GS P**

## GS \ nL nH

[Name] Set relative vertical print position in page mode

| [Format] | ASCII | GS | \ | nL | nH |
|---|---|---|---|---|---|
| | Hex | 1D | 5C | nL | nH |
| | Decimal | 29 | 92 | nL | nH |

[Range] 0 ≤ nL ≤ 255; 0 ≤ nH ≤ 255

[Description] Sets the relative vertical print starting position from the current position in page mode.

· This command sets the distance from the current position to [( nL + nH × 256) × vertical or horizontal motion unit] inches.

[Notes]

· This command is ignored unless page mode is selected.

· When pitch N is specified to the movement downward: nL + nH × 256 = N

When pitch N is specified to the movement upward (the negative direction), use the complement of 65536.

When pitch N is specified to the movement upward: nL + nH × 256 = 65536 - N

· Any setting that exceeds the specified printing area is ignored.

· This command function as follows, depending on the print starting position set by **ESC T**:

①When the starting position is set to the upper left or lower right of the printing, the vertical motion unit (y) is used.

②When the starting position is set to the upper right or lower

left of the printing area, the horizontal motion unit (x) is used.

. The horizontal and vertical motion unit are specified by **GS P**.

. The **GS P** command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.

[Reference] **ESC $**, **ESC T**, **ESC W**, **ESC **, **GS $**, **GS P**

## GS ^ r t m

[Name] Execute macro

[Format]

| | | | | | | |
|---|---|---|---|---|---|---|
| ASCII | GS | ^ | r | t | m |
| Hex | 1D | 5E | r | t | m |
| Decimal | 29 | 94 | r | t | m |

[Range] 0 . r . 255; 0 . t . 255;m . 0, 1

[Description] Executes a macro.

. r specifies the number of times to execute the macro.

. t specifies the waiting time for executing the macro.

. m specifies macro executing mode.

When the LSB of m = 0:

The macro executes r times continuously at the interval specified by t.

When the LSB of m = 1:

After waiting for the period specified by t, the PAPER OUT LED indicators blink and the printer waits for the FEED button to be pressed. After the button is pressed, the printer

executes the macro once. The printer repeats the operation r times.

[Notes]

. The waiting time is t . 100 ms for every macro execution.

. If this command is received while a macro is being defined, the macro definition is aborted and the definition is cleared.

. If the macro is not defined or if r is 0, nothing is executed.

. When the macro is executed (m = 1), paper always cannot be fed by using the FEED button.

[Reference] **GS :**

## GS a n

[Name] Enable/Disable Automatic Status Back (ASB)

| [Format] | ASCII | GS | a | n |
|---|---|---|---|---|
| | Hex | 1D | 61 | n |
| | Decimal | 29 | 97 | n |

[Range] 0 . n . 255

[Description] Enables or disables ASB and specifies the status items to include, using n as follows:

| Bit | Off/On | Hex | Decimal | Status for ASB |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Drawer kick-out connector pin 3 status disabled. |
| | On | 01 | 1 | Drawer kick-out connector pin 3 status enabled. |
| 1 | Off | 00 | 0 | On-line/off-line status disabled. |
| | On | 02 | 2 | On-line/off-line status enabled. |
| 2 | Off | 00 | 0 | Error status disabled. |
| | On | 04 | 4 | Error status enabled. |
| 3 | Off | 00 | 0 | Paper roll sensor status disabled. |
| | On | 08 | 8 | Paper roll sensor status enabled. |
| 4-7 | - | - | - | Undefined. |

[Notes]

. If any of the status items in the table above are enabled, the printer transmits the status when this command is executed. The printer automatically transmits the status whenever the enabled status item changes. The disabled status items may change, in this case, because each status transmission represents the current status.

. If all status items are disabled, the ASB function is also disabled.

. If the ASB is enabled as a default, the printer transmits the status when the printer data reception and transmission is possible at the first time from when the printer is turned on.

. The following four status bytes are transmitted without confirming whether the host is ready to receive data. The four status bytes must be consecutive, except for the XOFF code.

. Since this command is executed after the data is

processed in the receive buffer, there may be a time lag between data reception and status transmission.

. When the printer is disabled by **ESC =** (Select peripheral device), the four status bytes are transmitted whenever the status changes.

. When using **DLE EOT**, **GS** I, or **GS r**, the status transmitted by these commands and ASB status must be differentiated.

. The status to be transmitted are as follows:

First byte (printer information)

| Bit | Off/On | Hex | Decimal | Status for ASB |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Not used. Fixed to Off. |
| 1 | Off | 00 | 0 | Not used. Fixed to Off. |
| 2 | Off | 00 | 0 | Drawer kick-out connector pin 3 is LOW. |
| | On | 04 | 4 | Drawer kick-out connector pin 3 is HIGH. |
| 3 | Off | 00 | 0 | On-line. |
| | On | 08 | 8 | Off-line. |
| 4 | On | 10 | 16 | Not used. Fixed to On. |
| 5 | Off | 00 | 0 | Cover is closed. |
| | On | 20 | 32 | Cover is open. |
| 6 | Off | 00 | 0 | Paper is not being fed by using the PAPER FEED button. |
| | On | 40 | 64 | Paper is being fed by using the PAPER FEED button. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

Second byte (printer information)

| Bit | Off/On | Hex | Decimal | Status for ASB |
|---|---|---|---|---|
| 0 | - | - | - | Undefined. |
| 1 | - | - | - | Undefined. |
| 2 | - | - | - | Undefined. |
| 3 | Off | 00 | 0 | No auto cutter error. |
| | On | 08 | 8 | Auto cutter error occurred. |
| 4 | Off | 00 | 0 | Not used. Fixed to Off. |
| 5 | Off | 00 | 0 | No unrecoverable error. |
| | On | 20 | 32 | Unrecoverable error occurred. |
| 6 | Off | 00 | 0 | No automatically recoverable error. |
| | On | 40 | 64 | Automatically recoverable error occurred. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

Bit 3: If these errors occur due to paper jams or the like, it is possible to recover by correcting the cause of the error and executing **DLE ENQ n** (1 ≦ n ≦ 2). If an error due to a circuit failure (e.g. wire break) occurs, it is impossible to recover.

Bit 6: When printing is stopped due to high print head temperature until the print head temperature drops sufficiently or when the paper roll cover is open during printing, bit 6 is On.

Third byte (paper sensor information)

| Bit | Off/On | Hex | Decimal | Status for ASB |
|---|---|---|---|---|
| 0, 1 | Off | 00 | 0 | Paper roll near-end sensor: paper adequate. |
| | On | 03 | 3 | Paper roll near-end sensor: paper near end. |
| 2, 3 | Off | 00 | 0 | Paper roll end sensor: paper present. |
| | On | 0C | 12 | Paper roll end sensor: paper not present. |
| 4 | Off | 00 | 0 | Not used. Fixed to Off. |
| 5, 6 | - | - | - | Undefined. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

Fourth byte (paper sensor information)

| Bit | Off/On | Hex | Decimal | Status for ASB |
|---|---|---|---|---|
| 0-3 | - | - | - | Undefined. |
| 4 | Off | 00 | 0 | Not used. Fixed to Off. |
| 5, 6 | - | - | - | Undefined. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

[Default] n = 0 when DIP SW 2-1 is off, n = 2 when DIP SW 2-1 is on.

[Reference] **DLE EOT**, **GS r**

## GS f n

[Name] Select font for Human Readable Interpretation (HRI) characters

[Format] ASCII GS f n

Hex 1D 66 n

Decimal 29 102 n

[Range] n = 1, 48, 49

[Description] Selects a font for the HRI characters used when printing a bar code.

n selects a font from the following table:

| *n* | Font |
|---|---|
| 0, 48 | Font A (12 × 24) |
| 1, 49 | Font B (9 × 17) |

[Notes] . HRI indicates Human Readable Interpretation.
. HRI characters are printed at the position specified by **GS H**.
[Default] n = 0
[Reference] **GS H**, **GS k**

## GS h n

[Name] Select bar code height
[Format] ASCII GS h n
Hex 1D 68 n
Decima 29 104 n
[Range] 1 . n . 255
[Description] Selects the height of the bar code.
n specifies the number of dots in the vertical direction.
[Default] n = 162
[Reference] **GS k**

## ① GS k m d1...dk NUL ② GS k m n d1...dn

[Name] Print bar code
[Format] ①ASCII GS k m d1...d k NUL

| | | | | | |
|---|---|---|---|---|---|
| | Hex | 1D | 6B | m | d1...d k 00 |
| | Decimal | 29 | 107 | m | d1...d k 0 |
| | ②ASCII | GS | k | m | n d1... dn |
| | Hex | 1D | 6B | m | n d1... dn |
| | Decimal | 29 | 107 | m | n d1... dn |

[Range]

①0 ﹐m ﹐6 (k and d depends on the bar code system used)

②65 ﹐m ﹐73 (k and d depends on the bar code system used)

[Description] Selects a bar code system and prints the bar code. m selects a bar code system as follows:

| | m | Bar Code System | Number of Characters | d |
|---|---|---|---|---|
| ① | 0 | UPC-A | 11 ≤ k ≤ 12 | 48 ≤ d ≤ 57 |
| | 1 | UPC-E | 11 ≤ k ≤ 12 | 48 ≤ d ≤ 57 |
| | 2 | JAN13 (EAN13) | 12 ≤ k ≤ 13 | 48 ≤ d ≤ 57 |
| | 3 | JAN 8 (EAN8) | 7 ≤ k ≤ 8 | 48 ≤ d ≤ 57 |
| | 4 | CODE39 | 1 ≤ k ≤ 255 | 45 ≤ d ≤ 57, 65 ≤ d ≤ 90, 32, 36, 37,43 |
| | 5 | ITF | 1 ≤ k ≤ 255 | 48 ≤ d ≤ 57 |
| | 6 | CODABAR | 1 ≤ k ≤ 255 | 48 ≤ d ≤ 57, 65 ≤ d ≤ 68 , 36, 43, 45,46,47,58 |
| ② | 65 | UPC-A | 11 ≤ n ≤ 12 | 48 ≤ d ≤ 57 |
| | 66 | UPC-E | 11 ≤ n ≤ 12 | 48 ≤ d ≤ 57 |
| | 67 | JAN13 (EAN13) | 12 ≤n ≤ 13 | 48 ≤ d ≤ 57 |
| | 68 | JAN 8 (EAN8) | 7 ≤n ≤ 8 | 48 ≤ d ≤ 57 |

| | | | |
|---|---|---|---|
| 69 | CODE39 | 1 ≤ n ≤ 255 | 45 ≤ d ≤ 57, 65 ≤ d ≤ 90,<br>32, 36, 37,43<br>d1 = dk = 42 |
| 70 | ITF | 1 ≤ n≤ 255 | 48 ≤ d ≤ 57 |
| 71 | CODABAR | 1 ≤ n≤ 255 | 48 ≤ d ≤ 57 65 ≤ d ≤ 68,<br>36, 43,45,46,47 58 |
| 72 | CODE93 | 1 ≤ n≤ 255 | 0 ≤ d ≤ 127 |
| 73 | CODE128 | 2 ≤ n≤ 255 | 0 ≤ d ≤ 127 |

[Notes for ①]

. This command ends with a NUL code.

. When the bar code system used is UPC-A or UPC-E, the printer prints the bar code data after receiving 12 bytes bar code data and processes the following data as normal data.

. When the bar code system used is JAN13 (EAN13), the printer prints the bar code after receiving 13 bytes bar code data and processes the following data as normal data.

. When the bar code system used is JAN8 (EAN8), the printer prints the bar code after receiving 8 bytes bar code data and processes the following data as normal data.

. The number of data for ITF bar code must be even numbers. When an odd number of data is input, the printer ignores the last received data.

[Notes for ②]

. n indicates the number of bar code data, and the printer processes n bytes from the next character data as bar code data.

. If n is outside of the specified range, the printer stops command processing and processes the following data as normal data.

[Notes in standard mode]

. If d is outside of the specified range, the printer only feeds paper and processes the following data as normal data.

. If the horizontal size exceeds printing area, the printer only feeds the paper.

. This command feeds as much paper as is required to print the bar code, regardless of the line spacing specified by **ESC 2** or **ESC 3**.

. This command is enabled only when no data exists in the print buffer. When data exists in the print buffer, the printer processes the data following m as normal data.

. After printing bar code, this command sets the print position to the beginning of the line.

. This command is not affected by print modes (emphasized, double-strike, underline, character size, white/black reverse printing, or 90 . rotated character, etc.), except for upside-down printing mode.

[Notes in page mode]

. This command develops bar code data in the print buffer, but does not print it. After processing bar code data, this command moves the print position to the right side dot of the bar code.

. If d is out of the specified range, this command is ignored.

. If bar code width exceeds the printing area, this command is ignored.

When CODE128 (m = 73) is used:

. Refer to Appendix A for the information of the CODE 128 bar code and its code table.

. When using the CODE 128 in this printer, take the following points into account for data transmission:

①The top of the bar code data string must be code set selection character (any of CODE A, CODE B or CODE C) which selects the first code set.

②Special characters are defined by combining two characters "{" and one character. The ASCII character "{" is defined by transmitting "{" twice consecutively.

| Specific character | Transmit data | | |
|---|---|---|---|
| | ASCII | Hex | Decimal |
| SHIFT | {S | 7B, 53 | 123,83 |
| CODE A | {A | 7B, 41 | 123, 65 |
| CODE B | {B | 7B, 42 | 123, 66 |
| CODE C | {C | 7B, 43 | 123, 67 |
| FNC1 | {1 | 7B, 31 | 123, 49 |
| FNC2 | {2 | 7B, 32 | 123, 50 |
| FNC3 | {3 | 7B, 33 | 123, 51 |
| FNC4 | {4 | 7B, 34 | 123, 52 |
| "{" | {{ | 7B, 7B | 123, 123 |

[Example] Example data for printing "No. 123456"
In this example, the printer first prints "No." using CODE B, then prints the
following numbers using CODE C.
**GS k** 73 10 123 66 78 111 46 123 67 12 34 56

. If the top of the bar code data is not the code set selection character, the printer stops command processing and processes the following data as normal data.
. If combination of "{" and the following character does not apply any special character, the printer stops command processing and processes the following data as normal data.
. If the printer receives characters that cannot be used in the special code set, the printer stops command processing and processes the following data as normal data.
. The printer does not print HRI characters that correspond to the shift characters or code set selection characters.
. HRI character for the function character is space.
. HRI characters for the control character (<00>H to <1F>H and <7F>H) are space. <Others> Be sure to keep spaces on both right and left sides of a bar code. (Spaces are

different depending on the types of the bar code.)

[Reference] **GS H**, **GS f**, **GS h**, **GS w**

## GS r n

[Name] Transmit status

[Format]

| | | | |
|---|---|---|---|
| ASCII | GS | r | n |
| Hex | 1D | 72 | n |
| Decimal | 29 | 114 | n |

[Range] n = 1, 2, 49, 50

[Description] Transmits the status specified by n as follows:

| *n* | Function |
|---|---|
| 1, 49 | Transmits paper sensor status |
| 2, 50 | Transmits drawer kick-out connector status |

[Notes] . This command is only effective for the printer with serial interface.

. This command is executed when the data in the receive buffer is developed. Therefore, there may be a time lag between receiving this command and transmitting the status, depending on the receive buffer status.

. The status types to be transmitted are shown below:

Paper sensor status ( n = 1, 49):

| Bit | Off/On | Hex | Decimal | Status for ASB |
|---|---|---|---|---|
| 0, 1 | Off | 00 | 0 | Paper roll near-end sensor: paper adequate. |
| | On | 03 | 3 | Paper roll near-end sensor: paper near end. |
| 2, 3 | Off | 00 | 0 | Paper roll end sensor: paper adequate. |
| | On | (0C) | (12) | Paper roll end sensor: paper near end. |
| 4 | Off | 00 | 0 | Not used. Fixed to Off. |
| 5, 6 | - | - | - | Undefined. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

Bits 2 and 3: When the paper end sensor detects a paper end, the printer goes off-line and does not execute this command. Therefore, bits 2 and 3 do not transmit the status of paper end.

Drawer kick-out connector status ( n = 2, 50):

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Drawer kick-out connector pin 3 is LOW. |
| | On | 01 | 1 | Drawer kick-out connector pin 3 is HIGH. |
| 1-3 | - | - | - | Undefined. |
| 4 | Off | 00 | 0 | Not used. Fixed to Off. |
| 5, 6 | - | - | - | Undefined. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

[Reference] **DLE EOT**, **GS a**

## GS v 0 m xL xH yL yH d1....dk

[Name] Print raster bit image

[Format]

| | | | | | |
|---|---|---|---|---|---|
| ASCII | GS | v | 0 | m xL xH yL yH d1...dk |
| Hex | 1D | 76 | 30 | m xL xH yL yH d1...dk |
| Decimal | 29 | 118 | 48 | m xL xH yL yH d1...dk |

[Range] 0 ≤ m ≤ 3, 48 ≤ m ≤ 51
0 ≤ xL ≤ 255
0 ≤ xH ≤ 255
0 ≤ yL ≤ 255
0 ≤ d ≤ 255
k = ( xL + xH × 256) + ( yL + yH × 256) ( k ≠ 0)
[Description] Selects Raster bit-image mode. The value of m selects the mode, as follows:

| *m* | Mode | Vertical Dot Density (DPI) | Horizontal Dot Density (DPI) |
|---|---|---|---|
| 0, 48 | Normal | 180 DPI | 180 DPI |
| 1, 49 | Double-width | 180 DPI | 90 DPI |
| 2, 50 | Double-height | 90 DPI | 180 DPI |
| 3, 51 | Quadruple | 90 DPI | 90 DPI |

• xL, xH, select the number of data bits ( xL+ xH × 256) in the horizontal direction for the bit image.
• yL, yH, select the number of data bits ( yL+ yH × 256) in the vertical direction for the bit image.
[Notes]
• In standard mode, this command is effective only when there is no data in the print buffer.
• This command has no effect in all print modes (character size, emphasized, double-strike, upside-down, underline, white/black reverse printing, etc.) for raster bit image.
• If the printing area width set by **GS L** and **GS W** is less than the minimum width, the printing area is extended to the

minimum width only on the line in question. The minimum width means 1 dot in normal (m=0, 48) and double-height (m=2, 50), 2 dots in double-width (m=1, 49) and quadruple (m=3, 51) modes.

. Data outside the printing area is read in and discarded on a dot-by-dot basis.

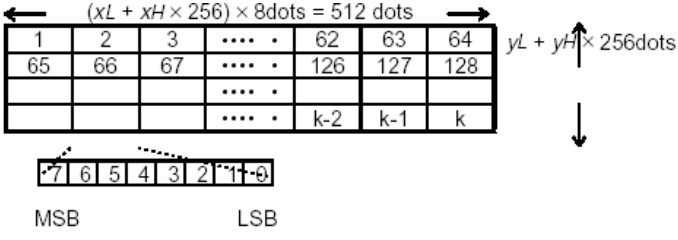
. The position at which subsequent characters are to be printed for raster bit image is specified by **HT** (Horizontal Tab), **ESC $** (Set absolute print position), **ESC** \ ( Set relative print position), and **GS L** (Set left margin ). If the position at which subsequent characters are to be printed is not a multiple of 8, print speed may decline.

. The **ESC a** (Select justification) setting is also effective on raster bit images.

. When this command is received during macro definition, the printer ends macro definition, and begins performing this command. The definition of this command should be cleared.

. d indicates the bit-image data. Set time a bit to 1 prints a dot and setting it to 0 does not print a dot.

[Example] When xL+ xH 256=64



## GS w n

[Name] Set bar code width

[Format] ASCII GS w n

Hex 1D 77 n

Decimal 29 119 n

[Range] 2 ≤ n ≤ 6

[Description] Set the horizontal size of the bar code.

n specifies the bar code width as follows:

| *n* | Module Width (mm) for Multi-level Bar Code | Binary-level Bar Code | |
|---|---|---|---|
| | | Thin element width (mm) | Thick element width (mm) |
| 2 | 0.282 | 0.282 | 0.706 |
| 3 | 0.423 | 0.423 | 1.129 |
| 4 | 0.564 | 0.564 | 1.411 |
| 5 | 0.706 | 0.706 | 1.834 |
| 6 | 0.847 | 0.847 | 2.258 |

. Multi-level bar codes are as follows: UPC-A, UPC-E, JAN13 (EAN13), JAN8 (EAN8), CODE93, CODE128

. Binary-level bar codes are as follows:CODE39, ITF, CODABAR

[Default] n = 2

[Reference] **GS k**

## FS ! n

[Name] Set print mode(s) for Chinese characters

[Format] ASCII FS ! n

Hex 1C 21 n

Decimal 28 33 n

[Range] 0 ≤ n ≤ 255

[Description] Sets the print mode for Chinese characters, using n as follows:

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | - | - | - | Undefined. |
| 1 | - | - | - | Undefined. |
| 2 | Off | 00 | 0 | Double-width mode is OFF. |
| | On | 04 | 4 | Double-width mode is ON. |
| 3 | Off | 00 | . | Double-height mode is OFF. |
| | On | 08 | 8 | Double-height mode is ON. |
| 4 | - | - | - | Undefined. |
| 5 | - | - | - | Undefined. |
| 6 | - | - | - | Undefined. |
| 7 | Off | 00 | 0 | Underline mode is OFF. |
| | On | 80 | 128 | Underline mode is ON. |

[Notes]

. When both double-width and double-height modes are set (including right- and left-side character spacing), quadruple-size characters are printed.

. The printer can underline all characters (including right- and left-side character spacing), but cannot underline the space set by **HT** and 90° clockwise-rotated characters.

. The thickness of the underline is that specified by **FS** ~, regardless of the character size.

. When some of the characters in a line are double or more height, all the characters on the line are aligned at the

baseline.

. It is possible to emphasize the Chinese character using **FS W** or **GS !**, the setting of the last received command is effective.

. It is possible to turn under line mode on or off using **FS ~**, and the setting of the last received command is effective.

[Default] n = 0

[Reference] **FS ~**, **FS W**, **GS !**

## FS &

[Name] Select Chinese character mode

[Format]

| | | | |
|---|---|---|---|
| | ASCII | FS | & |
| | Hex | 1C | 26 |
| | Decimal | 28 | 38 |

[Description] Selects Chinese character mode.

[Notes]

. When the Chinese character mode is selected, the printer checks whether the code is for Chinese or not, then processed the first byte and the second byte if the code is for Chinese.

. Chinese codes are processed in the order of the first byte and second byte.

. Chinese character mode is selected when the power is turned on.

[Reference] **FS .**, **FS C**

## FS – n

[Name] Turn underline mode on/off for Chinese characters

[Format] ASCII FS - n
Hex 1C 2D n
Decimal 28 45 n

[Range] 0 n 2, 48 n 50

[Description] Turns underline mode for Chinese characters on or off, based on the following values of n.

| n | Function |
|---|---|
| 0, 48 | Turns off underline mode for Chinese characters |
| 1, 49 | Turns on underline mode for Chinese characters (1-dot thick) |
| 2, 50 | Turns on underline mode for Chinese characters (2-dot thick) |

[Notes]

The printer can underline all characters (including right- and left-side character spacing), but cannot underline the space set by **HT** and 90° clockwise-rotated characters.

After the underline mode for Chinese characters is turned off by setting n to 0, underline printing is no longer performed, but the previously specified underline thickness is not changed. The default underline thickness is 1 dot.

The specified line thickness does not change even when the character size changes.

It is possible to turn underline mode on or off using **FS !**, and the last received command is effective.

[Default] n = 0

[Reference] **FS !**

## FS .

[Name] Cancel Chinese character mode

[Format]

| | | | |
|---|---|---|---|
| ASCII | FS | . |
| Hex | 1C | 2E |
| Decimal | 28 | 46 |

[Description] Cancels Chinese character mode.

[Notes]

. When the Chinese character mode is not selected, all character codes are processed one byte at a time as ASCII code.

. Chinese character mode is selected when the power is turned on.

[Reference] **FS &**, **FS C**

## FS 2 c1 c2 d1...dk

[Name] Define user-defined Chinese characters

[Format]

| | | | |
|---|---|---|---|
| ASCII | FS | 2 | c1 c2 d1...dk |
| Hex | 1C | 32 | c1 c2 d1...dk |
| Decimal | 28 | 50 | c1 c2 d1...dk |

[Range] c1 and c2 indicate character codes for the defined characters.

c1 = FEH

A1H ≤ c2 ≤ FEH

0 ≤ d ≤ 255

k = 72

[Description] Defines user-defined Chinese characters for the character codes specified by c1 and c2.

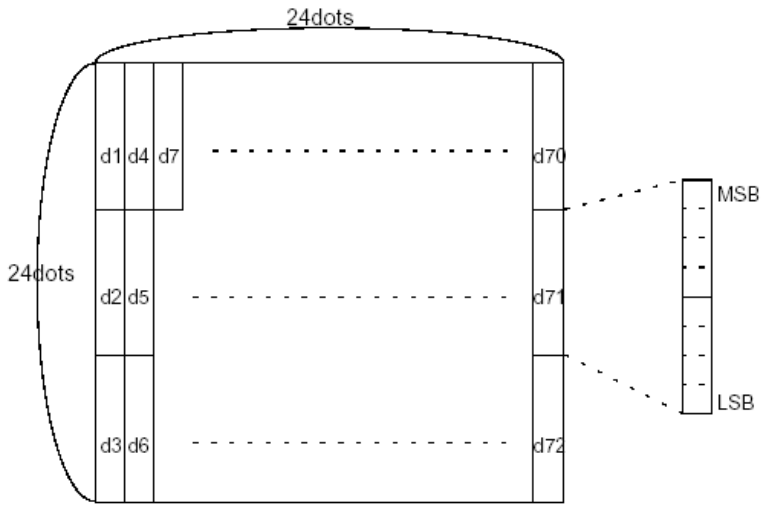
[Notes]

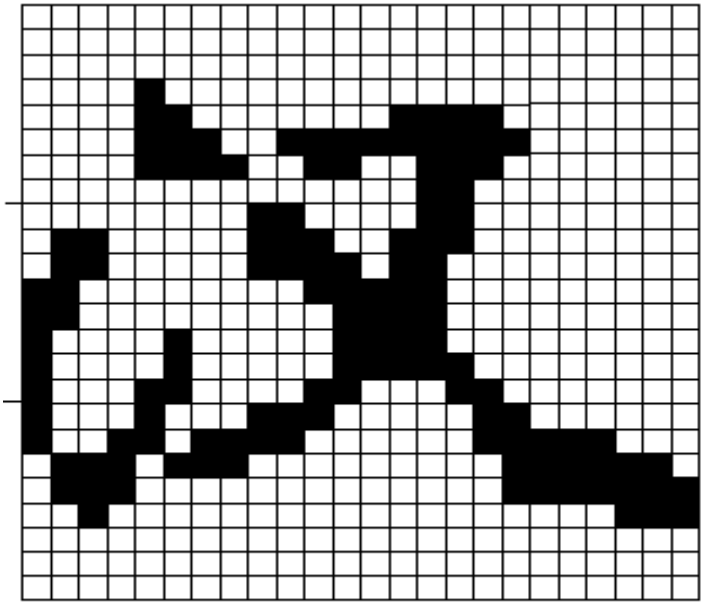
. c1 and c2 indicate character codes for the defined characters. c1 specifies for the first byte, and c2 for the second byte.

. d indicates the dot data. Set a corresponding bit to 1 to print a dot or to 0 to not print a dot.

[Default] All spaces.

[Reference] **FS C**





D1=00H, D4=00H, D7=00H, D10=00H. . . . . .
D2=1FH, D5=78H, D8=60H, D11=00H. . . . . .
D3=C0H, D6=30H, D9=38H, D12=70H. . . . . .

## FS S n1 n2

[Name] Set left- and right-side Chinese character spacing

[Format] ASCII FS S n1 n2

Hex 1C 53 n1 n2

Decimal 28 83 n1 n2

[Range] 0 ≤ n1 ≤ 255; 0 ≤ n2 ≤ 255

[Description] Sets left- and right-side Chinese character

spacing n1 and n2, respectively.

. When the printer model used supports **GS P**, the left-side character spacing is [ n1 . horizontal or vertical motion units], and the right-side character spacing is [ n2 . horizontal or vertical motion units].

[Notes]

. When double-width mode is set, the left- and right-side character spacing is twice the normal value.

. The horizontal and vertical motion units are set by **GS P**. The previously specified character spacing does not change, even if the horizontal or vertical motion unit is changed using **GS P**.

. The value cannot be less than the minimum horizontal movement amount, and must be in even units of the minimum horizontal movement amount.

. In standard mode, the horizontal motion unit is used.

. In page mode, the horizontal or vertical motion unit differs in page mode, depending on starting position of the printable area as follows:

①When the starting position is set to the upper left or lower right of the printable area using **ESC T**, the horizontal motion unit ( x) is used.

②When the starting position is set to the upper right or lower left of the printable area using **ESC T**, the vertical motion unit ( y) is used.

③The maximum right-side spacing is 255/180 inches for the

paper roll and is approximately 35.983 mm {255/150 inches}. Any setting exceeding the maximum is converted to the maximum automatically.
[Default] n1 = 0, n2 = 0
[Reference] **GS P**

## FS W n

[Name] Turn quadruple-size mode on/off for Chinese characters
[Format]

| | | | |
|---|---|---|---|
| ASCII | FS | W | n |
| Hex | 1C | 57 | n |
| Decimal | 28 | 87 | n |

[Range] 0 ≤ n ≤ 255
[Description] Turns quadruple-size mode on or off for Chinese characters.
- When the LSB of n is 0, quadruple-size mode for Chinese characters is turned off.
- When the LSB of n is 1, quadruple-size mode for Chinese characters is turned on.

[Notes]
- Only the lowest bit of n is valid.
- In quadruple-size mode, the printer prints the same size characters as when double-width and double-height modes are both turned on.
- When quadruple-size mode is turned off using this command, the following characters are printed in normal

size.

. When some of the characters on a line are different in height, all the characters on the line are aligned at the baseline.

. **FS !** or **GS !** can also select and cancel quadruple-size mode by selecting double-height and double-width modes, and the setting of the last received command is effective.

[Default] n = 0

[Reference] **FS !**, **GS !**